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## NEWS IN BRIEF

## Last minute hitch at Times

YET more disagreement over the operation of computers is at the centre of the refusal by the rank and file of print union Natsopa at The Times to agree to the formula for restarting publication reached with all other union leaders.

Clerical members of Natsopa are unhappy about Appendix 1 of the settlement which requires them to accept in principle the use of an ICL 2903 for commercial applications, which will entail the loss of 55 jobs.

## MicroCobol deal

TWO software houses in Australia have signed agreements with CAP-PP Microproducts covering the marketing of MicroCobol and application packages written in it. They are Admin EDP, of Sydney, and Computer Power, of Melbourne.

## 4,000 characters

A VDU that can store text abstracts with up to 4,000 characters and which can support a set of 500 different characters, including Greek and mathematical symbols, has been developed by Logica Data Systems for the Institute of Electrical Engineers. The IEE has ordered seven of the VDUs for online access to its Inspe service.

## Savings upgrades

DESPITE warnings by the Civil and Public Services Association about anticipated staff cuts within the Department of National Savings, the department said that its computer operations were unlikely to be seriously affected and that upgrades from ICL System 4 to 2900 series would go ahead.

## Major changes in office work predicted

MAJOR changes in the way people work in offices will soon be brought about by the convergence of the technology of computers, communications, and office automation. That is the view of Anne Westley, editor of the *Intest State* of the *Ari Report* from Infotech, who envisages in the near future managers needing typing skills and secretaries needing knowledge of computing to handle electronic office systems.

Recent changes in distributed processing, communications, and microprocessors are, says Westley, "beginning to gel into a single technology".

As a result of these convergent systems, functions such as DP, secretarial services and telecommunications management are "due for a major shake-up," she asserts.

The report, entitled "Convergence: computers, communication

and office automation", covers 600 pages and comprises papers from 20 experts, including Howard Morgan of the Wharton School at Pennsylvania University, and UK consultant David Butler.

An analysis of the nature of technology convergence, and the economic and political factors motivating its development, is provided, together with a review of the critical issues involved in implementation of such systems.



Thomas Watson resigns

THOMAS WATSON Junior is to resign as chairman of the executive committee of IBM's board of directors after eight years. The move follows his appointment as US Ambassador in Moscow (CW, August 2), which was confirmed last week by the US Senate.

## Immigrant controls speeded up

SCHEMES at the Home Office to introduce computers for immigration control (CW, August 1, 1979) are expected to come to fruition early next year when two different systems will be operating. One will be a minicomputer at Harmondsworth, holding information on illegal immigrants, and the other will be the computerisation of the processing of landing and embarkation cards.

A study is also under way by the working party of the International Civil Aviation Organisation of the feasibility of a machine-readable passport, which would consist of a plastic card with personal and visa information encoded magnetically. This would speed up immigration control at airports, and make possible online links to such databanks as that for illegal immigrants.

West Germany may introduce the first machine-readable passport as early as 1982, any scheme is dependent on what other countries decide to do, since passports and visas are international in their function.

The landing and embarkation cards scheme, which will require existing Home Office machines to be replaced by a new system, is intended partly to play down foreigners who overstay their time permitted on their visas. This at present can only be done by hand, on a spot-check basis.

## Year late

From front page

relatively slow device the number of instructions which can be handled each cycle is limited.

Sources close to the project estimate that the prototype System 36 is running at only 20% to 25% of its rated speed and that as well as operating system problems there are difficulties with the channels.

An enormous programming effort is working on the problem at IBM's Rochester, Minnesota facility.

The investigation into Plessey's possible involvement with the SA Air Force was initiated by the Anti-Apartheid Movement.

## Second review

ANSI's draft standard for subunit PL/1, X3.74, has entered its second public review and comment period. The current document is the eighth revision and incorporates changes made after the first review period which began last autumn.

## Reports of radar sales to South African Air Force put DEC in peril

DIGITAL EQUIPMENT, a major supplier of computers to Plessey, could be in serious trouble with the US government if reports about Plessey selling radar systems to the South African Air Force are substantiated.

At the time of going to press, Plessey had still not commented on reports in the national Press that its radar systems factory at Chesham, Surrey, was training South African Air Force personnel to operate DEC computers in radar surveillance systems. According to the reports, the systems were destined for installation in the North Transvaal, near South Africa's borders with Zimbabwe-Rhodesia and Mozambique.

Having been told by Computer Weekly of this news, a spokesman for the Department of Commerce in Washington said that if they were accurate an investigation into the affair would be started to establish DEC's degree of involvement with Plessey.

He said that a US computer company supplying equipment to South Africa for military purposes could have all its export licences withdrawn for a period, depending on the seriousness of the offence. It could also be fined up to £50,000 and the company

personnel directly involved could be imprisoned for up to five years.

The US government specifically forbids any US based computer manufacturer from selling equipment to South Africa for military type applications even if its kit forms part of a system supplied by a non-US manufacturer.

Plessey is a major OEM customer of DEC, being supplied with a variety of machines from DEC factories in Europe and the US. But DEC in the UK refused to comment when asked if any machines were supplied to the radar factory at Chesham.

The Foreign Office in London issued a statement saying that it was seeking further information from Plessey about the nature of

## Univac tops BC/7 line

A FOURTH model has been added to the top of Univac's BC/7 line of Intel 8080-based small business computers in the US. Called the BC/7-900, it offers main memory capacity doubled to 256K bytes and the processor is claimed to be almost 50% faster than that of the BC/7-500. The number of jobs which can be running concurrently in the processor has been doubled to four, and the enhancement is offered as a field upgrade.

First US deliveries are set for the second quarter of 1980. The BC/7-900 is set for UK launch just before the International Business Show in Birmingham in October, and is also scheduled to appear at Sibos in Paris in September.

## Amdahl-Memorex talks

From front page

with the smaller but much faster-growing Storage Technology. The talks are believed to have broken down because Storage Technology wanted a cash bid from Amdahl rather than a share exchange.

Storage Technology has been particularly successful with its large IBM 3350-compatible disc drives, which are important in the market served by Amdahl (CW, August 2).

Attractions of the Memorex merger for Amdahl are summed up in the word synergy. The

products are fully complementary, and an Amdahl spokesman in Sunnyvale, California — which is conveniently close to Memorex headquarters in Santa Clara — told Computer Weekly that as well as having many customers in common, each company had customers the other would like.

"We are also interested in the Memorex data communications products because that is a business we want to enter."

Amdahl lost out last year to NCR in a bid to acquire communications processor manufacturer Comten of Minneapolis.

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## Briefing NCR 'pensions' strike goes on

IT looks unlikely that there will be a quick end to the two-week-old strike at NCR's Dundee plant, where 8500, 8400 and 8200 systems are produced, as well as the NCR 1780 autoteiler (CW, August 2).

Staff are concerned at the company's decision to reduce its contribution to the pension fund by about £1 million since the fund produced a profit. "The company has not made any move to pass on this surplus by improving the conditions of the pension fund," said a union spokesman.

## Times formula

MEETINGS are being held this week of the rank-and-file Times members of the print union Natsopa, to consider the re-negotiation formula worked out by national officers and management. Despite widespread opposition, officials hope the settlement will be accepted.

On page 5, Rory Johnston analyses the story, and suggests that the Times has achieved nothing from the long and expensive suspension.

## Welsh factory

BURROUGHS' office systems division is to build a new 70,000 sq ft factory at Deeside Industrial Park, Clwyd. It will manufacture film-based coatings for such products as convertible typewriter ribbons and multi-strike film for word processing machines.

## Post Office offer

HAVING rejected the latest Post Office pay offer of about 18% (CW, August 9) members of the Society of Civil and Public Servants are discussing whether to escalate their strike action. Members of the Civil and Public Servants Association are still being lobbied on whether to continue strike action, and the results will be known tomorrow (Friday).

## Sales advance

DESPITE the serious financial problems of its US parent company (CW, August 9), ICL International has sold more IBM compatible Advanced Systems in the first seven months of 1979 than in the whole of last year — 8 compared with 68. Of the machines sold and installed since March the 7031 model has accounted for 27.

## Banking on 2960s

THE Bank of England has ordered two ICL 2960s worth £2.7 million to replace two 1904s in the Accountants' Department, which maintains registers of bank and other stocks. The system which allows 1900 personal and will be replaced by two ICL 2960s linked through 1904 terminal processors.



Christopher Chataway, former Minister of Posts and Telecommunications and of Industrial Development in the Heath government, has been appointed chairman of BTS, and his City experience is expected to be a considerable asset to the company.

## UK after 10% of telecomms market

BRITAIN'S effort to win a 10% share, worth about £10 million a year, of the world market for telecommunications switching systems has taken a step forward with the formal establishment of British Telecommunications Systems Ltd.

Under this banner the joint company formed by the Post Office, STC, Plessey and GEC (CW, March 1) will set out to exploit System X in overseas markets.

It was launched last January,

but legal and administrative problems have slowed its progress. Managing director John Sharpley, a former Plessey man, has been setting up the organisation and BTS is now ready for the international debut of System X at Telecom 79 in Geneva next month.

Christopher Chataway, former Minister of Posts and Telecommunications and of Industrial Development in the Heath government, has been appointed chairman of BTS, and

his City experience is expected to be a considerable asset to the company. Chataway is managing director of Orion Bank and has several other City appointments as well as being chairman of Honeywell's advisory board. In the UK Honeywell does not have a board of directors and the advisory board provides guidance for Honeywell's overall operations.

BTS is responsible for the promotion and marketing of

System X overseas and Chataway told Computer Weekly that although breaking back into world markets was going to be tough, with System X the UK had a product with which it could be achieved. He expects to be making several overseas visits to back up BTS operations.

Outlining the development of BTS, Sharpley said it would employ between 40 and 50, with agents located in some territories.

● Turn to back page.

## ICL hires back fire-hit 2960s

ICL has come to a unique compromise with the insurers of the two 2960s suspected of being contaminated by smoke after a fire at the Swiss Bank computer centre in London last year (CW, November 23, 1978).

ICL is to hire the machines from the insurers, Sun Alliance, for two years and use them for its own in-house DP requirements. If they are found to be fault-free at the end of this period, Sun Alliance will be able to sell them as second-hand machines with full support from ICL.

The agreement is the culmination of months of highly sensitive negotiations that followed the replacement of the 2960s involved in the fire, which were virtually brand new, with two new 2960s at a cost to the Sun Alliance of about £1.4 million.

Even though the fire itself was confined to the Dence air conditioning system, the smoke that huffed its way into the computer room contained chemicals which ICL insisted could have a serious long-term effect on the performance of the 2960s. For

that reason ICL said that it would not maintain the 2960s if Sun Alliance sold them to a third party.

But electronic repair specialists, G and E. Bradley, brought in by the insurers, decided that the machines could easily be reclaimed (CW, December 14, 1978) pointing out that the level of potentially harmful chemicals in washings taken from various parts of the hardware was very low.

ICL has now issued a statement that it will clean the two machines, to a standard approved by the Insurance Technical Bureau (an organisation which has been following the case closely) and will then recommitment and maintain them for use with ICL for two years.

ICL confirmed that the machines would then be made available to Sun Alliance for disposal, and that the provision by ICL of a maintenance service (to the new user) would depend on ICL's experience of the equipment during the two-year period.

ICL added that it would provide ITB with the opportunity of monitoring the performance of the equipment over the two years.

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**JOB VACANCIES**  
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## IBM buys BUPA benefit for 15,000 employees

FOLLOWING in the steps of many leading UK companies, IBM is to pay for all its 15,000 employees to be covered by the BUPA private medical insurance scheme.

The cost has not been revealed but although "Bulk Protection" packages cost much less per head than individual cover, it is unlikely that IBM will be paying out much less than £1 million a year.

Private medicine being an

athome to trade unions, their reaction has not been favourable. ASTMS, which is among the unions that have tried to win recognition from IBM, condemned the move.

The national officer for workers in the Health Service, Rag Bird, said ASTMS was absolutely opposed to the scheme. He rejected the idea of including private medicine in any package of fringe benefits.

## Infoline set to go live

LIVE usage of Infoline, the UK's scientific retrieval service, is expected to start within the next two weeks. Following delays caused by the need to rewrite the US-originated software to provide adequate response time.

A few test users already have access to the system which runs on GSI's bureau machine, and Infoline expects to start sending out invoices this month.

Originally it had been hoped to have Infoline working in February (CW, January 4) but the software, which is a modified version of Basia from the

Battelle Institute, was not performing well and had to be considerably revised.

At present, the whole of the World Patent Index, 15 million records, is up on the system and, by October, Chemical Abstracts with 25 million records will be accessible. One hundred and sixty customers are already signed up to Infoline, 60% on the Continent and 40% in the UK, and they will be given access at the rate of about 10 a week through the autumn. Most are primarily interested in the WPI data base.

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## Jargon is as jargon does

WE computer people are always being accused of using too much jargon. Personally I think the complaint is quite unfair. Other esoteric professions use jargon even more than we do. Think about it: what you and I call a heart attack doctors call cardiac arrest. According to Dr Rob Buchanan, himself a frequent satiriser of medical jargon, a bomb is known by ambulance men as an "echo delta". (Explosive device — ED, get it?)

What we call buying and selling, lawyers call conveyancing, which sounds like something to do with Pickford's (but then it is, when you move house). Hands up who knows what a writ of Mandamus is, or Ultinge and Bottomry.

Pause for relating the only joke I ever heard Vic Feather tell. A factory worker was suing his employers for compensation for injuries he received on the job. As the case went on it became clearer and clearer to the judge that the accident had been the man's own fault, which meant he was not entitled to compensation. Finally, when there was no doubt in his mind about this, he turned to the plaintiff's counsel and asked, "Mr Longbottom, your client does of course realise that 'Volunt non fit injuria'?"

Quick as a flash counsel

replied, "M'lud, they speak of little else in Barnsley."

Now where was I? Sociologists are of course among the worst perpetrators of jargon, talking about socio-economically deprived youths when what they mean is poor boys.

The point about our own computer jargon is that it is handy, providing a shorthand way of showing your colleague what complicated idea it is you are talking about. Outsiders complain endlessly about the word "software", but the fact remains that when someone says "We've got a fault" and you ask "Hardware or software fault?" and they say "Software" you can tell exactly what they mean.

A highly-technical lady friend of mine has just acquired a word processor in her office, and she is already talking about software and updates, which goes to show how convenient the words are.

HAS IBM got a sense of humour after all? An advertisement in the Wall Street Journal aims to show that there are so many different versions available of the word processor OS/2 that they could fill an office building. The advert chooses a fairly obvious building, and describes it thus: "The Empire State 197 wide by 429 long by 102 stories high — plus on occasional gorilla."



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## LETTERS TO THE EDITOR

# BCS ex-president on IDPM problems

I AM not a member of the IDPM but can genuinely sympathise with their problem over a secretariat. From the foundation of the BCS in 1957 with its handful of members (and honorary secretaries) through to the present time there has been a constant problem of how to provide the most effective office support within available revenue.

There has always been a strain on resources and a few years back it was touch and go whether the society could survive. For the IDPM the problem is what ours was — with the added dimension of inflation to cope with.

I do not profess to know the answer, but doubt whether it is to seek sponsorship from commercial firms — other considerations apart — if they were each putting up £1,000 (a year, presumably) would inevitably leave their marks on policy.

The BCS has had, and is grateful to, its commercial benefactors — most recently those who helped towards the fitting out of the new headquarters — and indeed it might not exist today if it had not had them. But there is the world of difference between taking ad hoc donations and depending on regular gifts to meet the running costs of what must essentially be an independent organisation.

The main lesson learnt by the BCS from its nearness to bankruptcy was that "windfall" receipts should never be relied upon to meet regular and con-

tinuing expenditure. Timing to my own society, the BCS can fairly be criticised on various scores, but not for awarding Fellowships to big names in industry, as implied in Computerweek (CW, August 2). Fellowship is a professional grade given only to Members who can prove their professional activities justify their acceptance as an authority in their particular field of computing" — to quote from the official "Aims and Activities" of the society.

And, Computerweek again, will the BCS never be able to nail the canard of academic bias (as opposed to professional) bias? Taking the presidential level as

where any bias would most clearly show, if we look at the list since Earl Mountbatten in 1986-87 — the last of the "Eminentes" — and include next year's President and Deputy President, we find five users (accountancy, banking, insurance, Civil Service, commerce), one university chancellor, three professors, three computer/electronics industry and one computer services.

Bias? C. P. MARKS  
President,  
British Computer Society,  
1975-76  
Civil Service College,  
London.

## The CASE statement in Pascal and BCPL

I HAVE been following Dr Judy Bishop's articles on Pascal with interest. I suppose that it ranks in the top three programming languages for its power and convenience.

However, I was disturbed by the assertion in Part 6 (CW, August 2), that "the CASE statement does not appear in any other language in this nice form". BCPL, of course, has a proper case statement and, indeed, also has the extremely useful DEFAULT case. I know that this is a common extension in Pascal systems, but only BCPL has it as standard.

So, the example in Figure 2 could be written more simply as

SWITCHON ch INTO

1) CASE 'M': day := mon; ENDCASE  
CASE 'T': day := (RDCH() = 'U' -> two, three); ENDCASE  
CASE 'W': day := wed; ENDCASE  
CASE 'F': day := fri; ENDCASE  
CASE 'S': day := (RDCH() = 'A' -> ant, aun); ENDCASE  
DEFAULT: error(1)

ch := RDCH() REPEATUNTIL ch = apaco

BCPL also has the advantage (not apparent in this example) that several statements can be included in one CASE without having to bracket them as a separate section, and that execution can be allowed to flow out of one CASE into the following one until an explicit ENDCASE is reached.

PETER ROBINSON  
Pendragon Ltd,  
Cumbria

## Dangers of haste in EFTS

The excellent article by Morris Edwards deplores lukewarm attitudes which cloud expectations for EFTS in the next 10 years (CW, July 20). Some caution is necessary, in my view, with some of the procedures he mentions.

He refers to a process of "cheque truncation", where cheques are microfilmed by the payer bank and then destroyed. There are occasions when a private citizen or a small company may need to have access to an original cheque after payment, to prove that the payment was made properly at the correct time, and that it may have gone in the wrong account. A microfilm print would not be such good evidence.

I applaud the development of EFTS for payment by companies of regular suppliers, salaries and wages, and dividends to shareholders, where there are clearly established data-flow controls with adequate internal audit cross-checks. But in smaller organisations, if there are changes of staff, errors inevitably occur, and an ability to trace the original cheque as supply proof of payment.

In a recent consulting assignment, a small client company's bought ledger had been badly kept on a semi-bureaucratic computer. One account had been paid twice — once the normal computer run, delayed by holidays, and once by hand in response to a red-inked statement. Recovery of the overpayment, in a one-time small supplier, was difficult, because the supplier had paid a second cheque into his private account. My client's ability to show both cheques to solicitors led to recovery of the overpayment of some £400.

The paid cheques are a view on an essential part of the audit trail for all payments as originated by EFTS.

HAROLD W. G. GEARING  
Malvern, Wores.

## Please write...

THE EDITOR welcomes letters commenting on subjects published in Computer Weekly, or on original topics. All letters must be accompanied by the writer's name and address, not necessarily for publication.

## THREE REACTIONS TO AN OPERATOR'S PLIGHT

# Career 'progression' to blame

I WAS very interested to read the piece on the operator who, despite considerable valuable experience as an operator and despite having had the initiative to enter on a tops programming course, has still not found a programming job after nearly 150 applications (Programmer Notes, August 2).

He may just have been unfortunate, but if we look at another worse, but in some ways comparable situation, one could conclude that much of the DP staff shortage blame can be laid at the doors of both general and board level management.

## Interview offered

I WAS surprised to read of the case of the ex-operator attempting to become a programmer finding it so difficult to obtain an interview (Programmer Notes, August 2). If the person concerned would be interested in working in the Cheltenham area, and would care to send us his or her details, we would certainly give consideration to arranging an interview.

J. M. CAINES  
J. M. Caines Associates Ltd,  
Jessop House,  
30 Cambrey Place,  
Cheltenham, GL50 1JP.

This even worse situation is characterised by the so-called "progression" of job titles — operator, programmer, analyst, DPM — then what? How many DPMs have been shelved on to the streets because they have found themselves in a firm which really doesn't understand computers or is not prepared to commit itself wholeheartedly to them or in a firm where most of the time is spent playing politics or manoeuvring for position? And more importantly, what happens to our erstwhile DPM when he does find himself marching up to the counter of his local job centre? He's going to feel bitter, victimised and distrustful of the DP industry itself — just like our operator trying to get a programming job.

Which brings me to the subject of that stultified, complacent and inward-looking society, the British Computer Society, from which I was happy to resign over 20 years ago. This society, under the guise of helping the computer industry, is at least partly responsible for not taking a lead in helping the staff in the industry.

The attitude of the BCS is plain enough for all to see. If I quote just one passage from a letter written by the deputy-president elect of the society, Frank Hooper, to Computing,

He wrote, "One day perhaps we could all insist that only holders of MBOS or FBS would be allowed to market computer equipment" (the italics are mine). This typifies the arrogant, hypocritical and hollow-thought attitudes of the BCS.

How many fundamentally competent people are forced into what amounts to a begging

situation by attitudes over which they cannot be expected to have any control and just what is self-officious (and the wonderful BCS going to need a stir itself to stop what amounts to a disgraceful waste of the country's resources)?

ROBERT T. STREET  
Woking, Surrey.

## Buy a micro and do your own thing

FURTHER to my article, "We must see to it that programmers are trained in their art" (CW, April 19), the operator mentioned in Programmer Notes (CW, August 2) would do well to buy a microcomputer supporting Cobol or Fortran and, while being employed as an operator, write programs on his micro. Then he should apply, not for a job as a trainee programmer, but simply as a programmer, offering to send listings of programs he has written.

Alternatively, he could write programs for small businesses in his locality, thus developing both his expertise and his pocketbook.

In conclusion, I should like to add that the "closed shop" of the computer industry is largely based on the fear of losing competent staff on costly wages. Sheer lack of imagination compels the industry to consider its attitudes, and I have no doubt that in three to four years we shall see considerable numbers of microcomputer-trained programmers coming on to the market.

We professionals shall have to look to our laurels.

J. M. HAMILTON  
Director,  
Datawise Ltd,  
Bath.

# What has The Times achieved in return for this £25 million stoppage?

PROSPECTS for the return of The Times have been getting alternately brighter and dimmer like a Bellisha beacon for such a long time that no one would be prepared to bet anything substantial on the present situation. But it certainly appears that, with the rank and file of only one union left to ratify the return-to-work formula, a re-start in September is very much on the cards.

It would indeed be a calamity if, having got so far, the negotiators were unable now to make enough minor changes to accommodate the members of Natsopa, whose reaction to the formula, in opposition to their national officers, has been distinctly cool.

Two different attitudes have been evident in the two main branches of the union. The machine room men (printing press operators) have been mainly concerned to get more money, regarding themselves as underpaid compared to the rest of Fleet Street, and the agreement does not provide that increase. On the other hand, the clerical branch is worried that the agreement commits them to operating new equipment, entailing the loss of about 55 jobs, before terms for pay, hours, redundancy, and so on have been worked out. One machine, an ICL 2803 for administrative DP, has been standing idle for four years waiting for a settlement on its operation to be reached. Since over half the 4,000 Times staff are shareholders, where there are clearly established data-flow controls with adequate internal audit cross-checks, but in smaller organisations, if there are changes of staff, errors inevitably occur, and an ability to trace the original cheque as supply proof of payment.

Assuming, however, that a solution is found, the obvious question that then arises is, what has The Times achieved in return for the £25 million and ten months of "aggro" the suspension will have cost? The answer can only be, exceedingly little.

The unions have agreed to the need for a common disputes procedure and a means of ensuring continuous production without interruption by unofficial strikes. But they have always admitted this. They have even agreed that there is a need to reduce overmanning. The problem in all these is what should the terms be. Management's stance in having a shutdown was

RORY JOHNSTON looks at the prospects for the future of The Times and how much — or how little — the suspension has achieved.

that they would not carry on production until these matters were settled — and they have not been. The most difficult issue of all, that of direct input by journalists into the typesetting system, has been deferred, with no guarantee that a solution will be found. Management's aim was in one sweeping operation to clear up all the operational difficulties that plague Fleet Street, and that has failed, although there is always a chance that subsequent negotiations will make progress along those lines.

From a purely objective, scientific point of view, management's aims are totally rational. Printing plants are seriously overmanned, the technology they use (both the equipment and the working methods) is antiquated, and newspapers have been dying left and right for decades, through competition with radio and TV. Rationality evaporates, however, when labour problems have to be considered.

The degree of bitterness felt towards management by many of the trade unionists can easily make one wonder how a business can operate at all in such an atmosphere. Behind the unionists' stance on any negotiations is a political attitude of "them against us", which leads them to attack not management's proposals but their motives for such proposals.

It is commonly claimed that The Times only wants to bring in new technology to weaken the power of the unions. Jake Eccleston, father of The Times journalists' chapel, goes farther and says the company is "interested in the monopolisation of information, and bigger profits."

However, there is a more serious, in fact fundamental, problem facing the union leaders — that if automation reduces the number of jobs, then unions will lose members; and that they cannot countenance

In the case of the composers, whose jobs would be completely eliminated in the long term, the National Graphical Association would be wiped out. There is no way the NGA would acquiesce to this, and were management to try to press ahead without them, the principle of union solidarity would lead all other workers to down tools in support, regardless of logic.

The scientific truth that the world no longer needs composers has to give way to the political truth that other unions must be supported in their fights with management, no matter how unsound their stance. Unionists differ over the soundness of the NGA's stance. Eccleston claims that direct input would necessarily lead to lower editorial standards, which is clearly nonsense, and adds, "I don't think a journalist is a printer," overlooking the fact that new technology inevitably changes demarcation lines.

On the other hand Chris Robbins, secretary of the Natsopa London Clerical branch, says that direct input is "absolutely inevitable" in the long term, adding that humanitarian concerns are the current problem. He is sceptical of redundancy payments schemes, citing the number of his former members who come back to him after two years, their money all gone, desperate to get back to work.

The situation, in short, is impossible. The UK Press must cut costs substantially in order to survive, but there is no way the unions will agree to lose many members. Some unionists want the new technology brought in, not so that fewer people can produce the same number of newspapers, but so that the same number of people produce more papers. They do not explain how all the other costs, apart from the wages of the printers, could be covered, or how the public could be persuaded to buy or read all the new titles.

The logical course of action, starting all over again at the beginning in setting up The Times, is apparently not feasible politically.

Will it take the death of our entire newspaper industry to convince people that the politics is ludicrous? Possibly so.

## ICL sticks to W Gorton project

FOLLOWING the government's plans to cut back on investment grants in intermediate development areas, ICL is reviewing its plans to reconstruct the old mill and other buildings on its West Gorton, Manchester, site (CW, July 28).

Despite statements attributed in the Manchester press to former Industry Minister Gerald Kaufman, there is no question of abandoning the project altogether, and no threat to employment by ICL.

The problem for ICL is nevertheless serious, because according to the Department of Industry, the company will not now get £1.5 million of the money it was expecting to receive in development grants.

ICL is therefore investigating other ways of raising the money, and possibly scaling down the scope of redevelopment.

The new ICL production plants in Manchester are almost

complete, and production workers will be moving out of West Gorton shortly. Thereafter it will become a research and development centre.

Local MP Kaufman, Member for Ardwick, commented that a factory which would have gone ahead and provided perhaps 1,500 jobs had Labour remained

in office, had now been thrown into doubt as a result of Conservative policy.

ICL emphasises that no decision has yet been taken but that no threat to employment exists — although clearly if the plans are scaled down, fewer construction workers will be required on the building project.

Both the Labour Party and the TUC are to debate microelectronics and new technology at their annual conferences in the next few weeks.

The Labour Party will debate resolutions calling for an immediate investigation of the implications of microprocessors, especially in providing a means of improving living standards and communications. There will also be a call for a positive programme for the 1980s and 1990s to help combat the difficulties created by the silicon chip.

One resolution will demand that the National Enterprise Board and the Scottish Development Agency are used to invest in the electronics industry.

At the TUC Congress, the subject will be debated no less than seven times. These will include motions calling for a strategy to deal with the deep social changes that will take place, and full public ownership of this industry through the NEB.

Infoline is already connected to the Post Office's International Packet Switched Service, but needs to test its X25 interface on

For further details, please cut out this advertisement, insert your name, address and telephone, and post to: Professor Enid Mumford, Manchester Business School, Booth Street West, Manchester, M15 6PB Tel: 061-273 8228

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## Award to brewery manager

WHEN Barry Dumble was named runner-up in this year's Data Processing Manager of the Year competition, there was only one logical place for the presentation — his computer room at Vaux Brewery, Sunderland.

Barry (left) is pictured receiving his award, a set of lead crystal glasses, inscribed silver tray and a £150 cheque, from the chairman of the Institute of Data Processing Management, Neville Taylor.

The competition, run annually by the Institute and sponsored by Data Logic, is for achievements in computer management. Barry was selected runner-up for successfully introducing a number of key online systems on Honeywell 64/30 which are making "a substantial contribution to his company's operation and enhancement of its service to customers."

In the UK, inquiries and requests for access to Euronet have

exceeded estimates and urgent steps are being taken to increase the number of ports available on the London node from the initial 12, which are now fully booked. Access during the final tests will be free of charge. After full acceptance from the contractors, the standard charge will be 2 pence per minute plus 1.2 pence per 10 64-byte segments, with reductions at night and weekends.

The National Physical Laboratory and other subscribers to the experimental European Informatics Network are also preparing to cut over to Euronet.

The range of add-on systems extends from an RP11-compatible disc controller, capable of handling two storage modules of up to 300M bytes each directly, through 256K byte and 24K byte memory boards, Q-bus serial line interfaces, to a 1.5M byte disc emulator.

## Euronet due to start in October

FINAL acceptance testing of the Euronet packet switched network has started, and commercial service is now due to begin in October. Infoline, the UK online bibliographic retrieval service, claims to have implemented the first host connection to Euronet.

Infocline is already connected to the Post Office's International Packet Switched Service, but needs to test its X25 interface on

## Plessey introduces range of DEC add-ons

A WIDE range of hardware add-on systems for Digital Equipment Corporation's (DEC) PDP-11 series has been produced by Plessey Peripheral Systems. They range from interface, memory and control boards up to a general purpose microcomputer.

The latter is based on either the DEC LSI-11 or LSI-11/23 processor board, and includes two single or dual density floppy disc drives. It is also capable of supporting a five or ten Megabyte hard disc sub-system. The range of add-on sub-

systems extends from an RP11-compatible disc controller, capable of handling two storage modules of up to 300M bytes each directly, through 256K byte and 24K byte memory boards, Q-bus serial line interfaces, to a 1.5M byte disc emulator.

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\* Roll or Page Mode  
\* Video Output for External Monitors  
\* Full Character Editing Features  
\* Block Transmission from Screen by Line or Page  
\* Green Phosphor Non-glare screen



Models 7001-7002  
\* 24 Lines of 80 characters per line  
\* Selectable Baud Rates from 50 to 19,200 Baud  
\* Dual Interface — CCITT V24 and 20/60 mA Current Loop  
\* Teletype Compatible  
\* Hard Copy Printer Output  
\* Selectable Half or Full Duplex  
\* Video Output for External Monitors  
\* Green Phosphor Non-glare screen



Model 7000  
\* Teletype Compatible  
\* 24 Lines of 80 Characters per line  
\* Selectable Baud Rates from 50 to 19,200 Baud  
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## MICRO NEWS

## Dual CPU system for UK

A SMALL business system using a dual processor configuration and costing under £3,000 has been introduced into this country by Computrade of Leatherhead.

Called the Superbrain, and manufactured by Intertec Data Systems of Columbia, South Carolina, the system uses two Zilog Z80A microprocessors. One operates as the host processor of the system, and runs all operating and user software. The second processor is the disc controller, running the operation of the integral dual floppy disc drives.

The basic Superbrain comes with 64K bytes of memory, 12 inch screen and keyboard, as well as the dual density floppies, which offer an additional 320K bytes of store. Serial, parallel and S100 interface ports are also provided, which allow the attachment of printers, and in excess of 10M bytes of hard disc storage.

Using the popular CPM operating system, a wide range of software is available for the system, including Fortran, Cobol, Basic and APL high level languages. In addition, applications programs for payroll, accounts receivable, accounts payable, inventory control, general ledger and word processing are also available.

Computrade's marketing plans for the Superbrain include the appointment of separate dealers that will specialise in selling the system, as well as retelling it through the existing distributor network.



THOUGH it does not somehow seem the same in black and white this is the new Green Screen for the Commodore Pet, now being marketed in the UK by Petsoft. A contrast-enhancing filter mode of periscope, it can be fitted directly over the top of the existing Pet Screen. According to Petsoft, it filters out ambient light on the screen, making it legible in direct sunlight, and into the displayed characters green, which is the peak sensitivity band of the human eye.

## RUF to be Pet dealer

CROWBOROUGH based RUF Computers has been appointed as a main dealer and distributor of the Commodore Pet micro-computer.

The company — its name is pronounced "roof" — has recently been taken over by Scan Data International, the first move by that company into the packaged small machine marketplace. The appointment is thought to be the first by

Commodore of a general systems house to Pet dealership.

Peter Beckett, managing director of RUF, feels that the association with the systems house will give his company an edge over shop-based retailers in advising customers on the use of microcomputers for commercial accounts work. A microcomputer manager, Steve Cooper, has been appointed to head up the operation.

## Plain English solution to software problem

By Martin Banks

THE widely discussed problem of software for small business applications of microcomputers could find a solution next month, when California-based Personal Software starts marketing Visicalc.

Developed by another US company, Software Arts, this package is aimed directly at the growing small business market, especially in the area of the manipulation of numeric data. Its prime advantage for the microcomputer scene, where a large percentage of potential users are not computer specialists, is that programs can be developed using plain English, even though the package is actually written in machine code.

Available on floppy disc for \$89.50 in the US, it is expected to be introduced into the UK soon after its September launch in America.

Personal Software products are available in the UK through a number of distributors, including the Byte Shop, Persoft, T & V Johnson and Keen Computers.

Initially it will be available only for the Apple II computer, but there are already plans to make versions for the Pet and Tandy TRS 80.

In use, Visicalc creates on the video display an electronic "blackboard" with many rows and many columns. The size of this grid far exceeds the size of the screen, which only portrays sections of it at a time.

Any square in this grid can then be defined as a label, a value, or a function. In this way, in applications such as financial analysis, the label can be used to define such items as a company name, the value can be used to define a series of financial results such as turnover for the last two years, and the function can be used to define a relationship between any other squares on the grid — in this case the function could be a percentage calculation between the two turnover figures.

It is being claimed that Visicalc can dramatically speed up the program writing process, and that the programs can be written by anybody, with or without the relevant programming skills.

## PROM-zapping

ZAPPING the memory of 104 ultra-violet erasable PROMs simultaneously is now possible with the 100T PROM eraser from Microsystems Services.

Able to accommodate either the 104 individual devices, or a complete circuit board, the 100T can be set to expose the memories to ultra-violet light for up to 40 minutes.

## Packages for Apples

TWO software additions to the Apple II computer are now being marketed in this country by Apple dealer Personal Computers. One takes the system into the medical education field, while the second allows an Apple to be used as a simulator for the Tektronix 4010 family of terminals.

The medical training program has been developed by the Milliken Communications Corp in America, and consists of a series of computer-based seminars that simulate a conversation between a student and lecturer.

The seminars are stored on floppy discs and are available in three basic categories: surgery, internal medicine and primary care. A total of 40 individual topics are covered on two discs, each costing £14.50, each topic providing a tutorial session of about an hour's duration.

They require active participation by the student, who has to respond in his/her own words to the questions via the keyboard. If the answer shows familiarity with the subject, the program moves on to the next part of the tutorial; otherwise, more detailed information is given.

The Tektronix simulator, called Teksim, enables an Apple to be used as a terminal of a host computer. To display high resolution colour graphics with minor changes to the programs running in the host.

Costing £300, Teksim comes as a plug-in read-only memory and a special adaptor unit. Its characters have been designed to simulate as closely as possible the Tektronix hardware characters to ensure program compatibility.

This does involve a compromise, in that a Teksim-equipped Apple can display 32 lines of 68 characters, while a Tektronix terminal can display 35 lines of 73 characters. There is a chance, therefore, that display overflow and wraparound will occur, though for most graphics applications this should not present a significant problem.



A launch present came on opening day for the Computerland shop Birmingham. An order for ten ITT 2020 microcomputers was handed manager Jim Atfield (left), by Bert Glover (centre) and Neil Gifford (right), which sells computer systems to the agricultural industry.

## Two added to chain

RAPIDLY expanding its coverage of the country with high street computer stores, the Computerland chain, formerly known in this country as Byte Shops, have added two more stores to serve provincial centres.

The latest additions are in Birmingham and Manchester, and the chain is currently planning to open another, in Glasgow, later this month.

Birmingham was the first to open, and immediately received an order for ten ITT 2020 computers from Farmplan, a group of farm companies specialising in buildings and computer systems for the agricultural industry.

As with the Birmingham and the latest addition in Manchester, the ITT 2020 microcomputer will be handling systems from ITT, Plessey, Ohio Scientific, Crummuell, North Star Horizons, Vectro Graphics, Nascam and Commodore. It will also offer a range of peripheral products, packaged software and books. The manager is a computer consultant, Peter King.

The Birmingham shop can be found at 64-66 Hurst Street, while the Manchester operation is at 11 Gateway House, Piccadilly.

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PS Make an appointment to visit our Micro Hardware and Software Exhibition at London Micro Technology Centre.

There is no such thing as the future, there are only future options. Successive generations decide which options to take up, either by considered choice and directed effort or by default.

One literary mode which seeks to expand the human imagination and give substance to the vague

possibilities of tomorrow is science fiction, and a recent Univac conference in the South of France (CW, August 2) posed the problem: "What is the relationship of science fiction to reality?" ROBIN WEBSTER reports from Nice that instead of one solution, the conference produced answers as varied as the occupations of the speakers.

## Views differ on the role of SF

THE fashionable analysis is that futuristic fiction evolved from the technological revolution; the most memorable predictions made by writers tending to be of a technological nature (robots, computers, the atomic bomb, and space travel). But historically, science fiction has taken the pulse of change long before scientists even realised change had a shape.

As Professor Ian Clarke, of the English studies department of Strathclyde University, suggested, science fiction is part of a deep social process: "It was born out of Darwinism with technology as a midwife," he said. "Its major implications are therefore social, and it is a valuable literary method through which society may examine and continuously reassess itself."

One speaker felt that such a reassessment was needed immediately. Concerned that most people are dazzled by what he calls "technological glitter," Heinz Wolff, head of bio-engineering at the Clinical Research Centre, warned that society might be in a trance of self-deception.

"The impact of technology has been grossly exaggerated," he said. "What are we seeing at present is only a veneer."

Wolff's role during the conference was one of Devil's Advocate, and he exemplified his part well by listing his talk, "The future is farther than you think."

"Technology is the mythology of skill," he said. "For the last 5000 years technology has been working towards the abolition of physical labour, but we have discovered that this is bad for our health. What we must now ask is if the new technology will eliminate thought in the same way."

"Already it could be said that we are regressing to a food gathering, pre-civilised, pre-settled existence because we are losing our self-reliance; we need energy for our homes and petrol for our cars, and we have to keep going further to get them."



Heinz Wolff. Concerned about the effects of "technological glitter" on society.

One possible alternative, he said, was life-long education for every individual.

Wolff did not denigrate the idea of the "replete" society, a world where anybody could have anything and everyone excelled at something. But "technology is not helping us move towards that type of situation," he said. "It has not met the challenge of how we should reappropriate our resources. Nor has it helped us to become more aware of its own dangers."

## 'Fixed media drives will dominate sales in 1982'

FIXED media drives will account for 66% of world disc drive sales, by value, in 1982 compared with less than 42% in 1978. This is one of the main predictions in a report published by the California consultant James Porter.

The report predicts that sales of fixed media drives in the 30 to 200 Megabyte range will grow at an average rate of more than 84% between 1980 and 1982. Fixed media drives below 30 Megabytes will see a 26% a year increase in sales.

Sales of cartridge disc drives with capacities over 12 Megabytes are expected to grow at more than 47% a year, but another category of drive with removable media — storage module drives in the 30 to 80 Megabyte range — are expected to have an average annual sales growth of less than 10% up to 1982.

\*1979 Disc Trend report on rigid disc drives, by James Porter, 5550, Disk/Trend Report, 1224 Arbor Court, Mountain View, California, 94040, USA. Tel: (0101-415) 991 6200.

## Packages for information storage

A TWO-DAY conference on software packages for information storage and retrieval is to be held in London in November. In addition to formal papers, it will include presentations from package suppliers.

More information on the conference, scheduled for November 12/13 at the Royal Society, premises in Carlton House Terrace, is available from Jennifer Edkins, Institute of Mining and Metallurgy, 44 Portland Place, London W1 (tel: 580-3802).

## How to stop having to explain why the computer won't do everything the boss expects



Every DP man has had the experience of explaining to management the limitations of his system. With any system based on applications, limitations are inherent — and removing them discouragingly expensive.

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And, incidentally, run times can be significantly reduced.

All this makes for a much happier working environment for your staff. But from management's point of view the important thing is the saving of money. IDMS (Integrated Database Management System) has typically saved 30% of both development and maintenance costs in the field.

IDMS is obviously particularly suited to businesses in which a number of different user departments need to look at the same sets of facts from different points of view: good examples include construction, banking and insurance, and production and stock control in general manufacturing. It is simple to use — the language is a high level one based on COBOL. And it conforms to the CODASYL standard.

Satisfied users include British Aerospace, Tootal, George Wimpey and Short Brothers.

Ring Brian Nunn, or the Marketing Department, on Reading (0734) 581268 for an exploratory talk. Or write to him at ICL Dataskil, Reading Bridge House, Reading, Berkshire, RG1 8PN.

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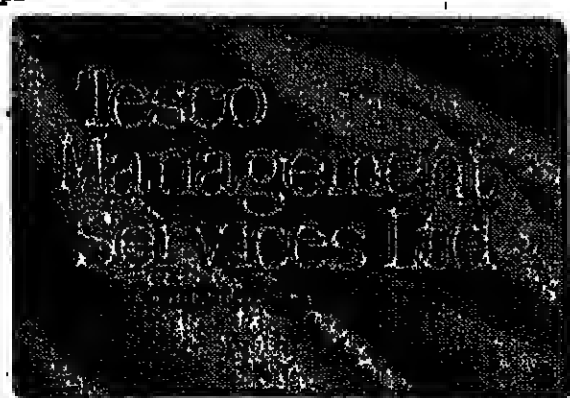
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## PEOPLE AND EVENTS



MORE than eight RTZ companies took part in an "It's a Knockout" competition in Bristol, where teams tackled nine arduous games. The RTZ Computer Services team of operators, analysts and group leaders, pictured here, managed to win second place in spite of the fact that they have only produced one. They lost in the final by only three points.

## UK telephone gear firm established

A TELEPHONE equipment division has been launched by Lndis and Gyr in the UK. Heading the new venture is Peter Arnold, who will be based at the Lndis and Gyr headquarters in North Acton.

The apparatus to be dealt with by the new division includes coin-operated telephones, call charge printers, call counters for telephone exchanges and equipment for processing and storing data relating to telephone calls.

Bob McPherson, formerly North European manager for the computer special systems department, has now become Southern regional general manager for Systems.

David Evans has been appointed to join BIS Applied Systems DP management consulting team. Prior to this, Evans worked for the Ministry of Defence, and has been involved in a wide variety of projects using minicomputers and word processing equipment.

Robert Hall has been named as the marketing representative for Cincom Systems UK. He has been with the company for four years and has worked as a systems engineer and an analyst in the company's custom systems and consulting division.

Mike Rogers has been appointed European customer services manager for Molcomp, based at the company's European headquarters in Wokingham. Rogers has worked for Honeywell Information Systems for the past 15 years, rising from systems engineer to Northern regional director of customer services in Manchester.

## Top men at new Harris division

FOLLOWING the formation of the Harris Information Systems International division, Richard Holden has been appointed general manager of the data communications and computer systems divisions of Harris Systems in the UK. He will report directly to the newly appointed vice-president and general manager of the division, M. Andrew Haladaj.

Holden will be supported in his new role by Andy Surtees, UK sales manager for the RH00 and 1000 terminal systems; and Clive Boon, sales manager for the 100, 500 and 800 ranges. David Hyams is to head a team of 60 engineers with responsibility for both product ranges.

Chris Pacey, who has spent three years in IBM working on computer applications, has joined the Southern division of Safe Computing as a project manager. A former programmer with CBS Records, Lyn Redlean has become a computer programmer in the same area. Another new programmer for Safe is Lindsay Bradfield, who formerly spent four years with the Meteorological Office.

## Information on Prestel

FOR those still in the dark about the possible effects of Prestel, the Post Office's computer information service, which will be operating a public service this autumn, Eastern Counties Newspapers and Norwich Union, in association with Granada TV Rental is arranging a one-day seminar in Norwich on September 19.

For further information ring Roy Towler of ECN on 0813 28311.

Stephen Gaal has become director of software development for Data General, where he will report directly to president Elson de Castro. Formerly manager of systems engineering, Gaal will now be responsible for Data General's systems software development, including the Research and Development centre for advanced development in North Carolina. Before joining the company as an applications engineer, he worked for IBM and Bell Telephone Laboratories.

By Judith Morris



Tim Harrett has joined Microsystem Services as product engineer, directly responsible to the managing director, Jim Knott, for the technical aspects of customer service. Bob was previously employed by Perfekline where he designed control systems for three years, and was a marketing specialist for further two.

Rehah Vaughan-Williams, formerly a senior consultant with CMG UK, has been appointed an associate director of the company. He takes up his position with the UK Package and Technical Support group, which is responsible for all of CMG's UK packages and data communications.

Tim Jarvie has become a member of Computer Machinery Company's technical support team based in Newcastle. He will be responsible for pre and post sales support to CMC users throughout Tyne and Wear and Northumberland. He was formerly a system analyst with the Newcastle and Gateshead water company.

## DIARY

AUGUST 19-22 Third Rocky Mountain Symposium on microcomputers. Bell Computer Society, Penger Park, Colorado. Contact: Michael Thadde, Dept of Computer Science, Colorado State University, Fort Collins, CO 80523.

SEPTEMBER 3 Forum on microcomputers. ICS, 11 Mansfield Street, London W1 1LW.

SEPTEMBER 4-7 European Fall 79. ICS Computer Society, Capital Hilton Hotel, Washington DC. Contact: Computer Fall 79, PO Box 600, Silver Spring, MD 20910.

SEPTEMBER 6 The future of real time languages in process control. ICS Process Control Specialist Group. Reading University, Reading, RG6 2AA.

SEPTEMBER 10 Database systems and information retrieval. ICS Information Retrieval Group. Computer Laboratory, Cambridge University, Cambridge.

SEPTEMBER 11 Performance management. IDPM West London and Oxford branch. Testland House, Hatfield Road, Slough, RG4 0JH.

SEPTEMBER 12-14 Shape recognition and artificial intelligence. AFTEC and IRIA. Toulouse, France.

SEPTEMBER 13 Optimal control of large scale systems. IEE, Savoy Place, London WC2 0BQ.

SEPTEMBER 17 An afternoon with James Mordn. IBM, CUA and Butler Cox Associates. The Grosvenor House Hotel, Park Lane, London.

SEPTEMBER 17-21 Computer science and law. Courses: CREST and SRC. Swansea University, Swansea. Tel: 0782 25878 ext 502.

SEPTEMBER 25 Aspects of a computer controlled digital telephone exchange - the Plessey PDX. IETE, Granville College, Sheffield, 18.00.

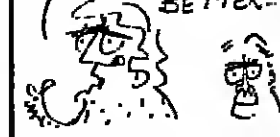
SEPTEMBER 28 Introduction to microprocessors. IETE, Leisure Centre, Stevenage, 18.30.

## Winning File

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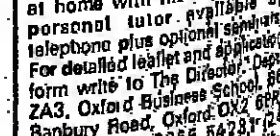
...LEADING THE QUEUE AT THE COUNTER.



...LEADING THE QUEUE AT THE COUNTER.



...LEADING THE QUEUE AT THE COUNTER.



...LEADING THE QUEUE AT THE COUNTER.

The traditional idyllic picture of life on the farm has, of course, little resemblance to reality. The place of the micro in agriculture may seem as unlikely a juxtaposition of concepts, but in fact, as NICHOLAS ENTICKNAP reports, life on the farm is coming more and more to depend on sophisticated concepts of accounting analysis and process control possibilities. Increasingly, these developments are making use of the micro.

# Running a farm with a micro

WHEN my editor first asked me to write about micros on the farm, I was struck by the incongruity of the theme. Your typical idyllic pastoral scene, with cows grazing peacefully in the sun-dappled breeze, seems to belong to a different world from the dynamic, thrusting, fiercely competitive technological revolution that has produced the microprocessor.

But of course, today it is a case of chips with everything. And it is not really so surprising that farmers should be taking a great interest in the potential of the micro. Farming in the UK has been extremely efficient ever since village economy subsistence farming developed into

the more scientific activity we call agriculture.

The history book tells us that this transition dates back to the beginning of the 18th Century, when enclosures were abolished, crop rotation introduced, and came to men like Farmer Townsend and Coke of Holkham. The UK lead in farming practice has continued to this day, as we are being constantly reminded by those endless political arguments about the Common Agricultural Policy and the green pound.

As might be expected, the biggest interest is in the development of micro based data processing systems for the farmer. Farms are, after all, small businesses; their owners

have to maintain accounts, make tax and VAT returns and make management decisions as in any other business. Until the advent of the micro, computers were too expensive for all but the biggest farms. Now there are probably 50,000 firms that can justify their own in-house system.

With such a large potential market, systems specially designed for farmers are becoming available in numbers. Sufficient numbers, in fact, to give the farmer a headache when he comes to choosing between them. Help is at hand, however: the Agricultural Development and Advisory Service (ADAS) of the Ministry of Agriculture is preparing a report evaluating

the systems currently available. This is scheduled for publication in January.

Peter Russell, the ADAS executive responsible for hardware evaluation, says the objective of this report is "to give a dispassionate view of the micro systems available for farmers. It will not be a 'Which?' report, but will comment in fairly general terms on the minimum configuration needed to do a particular task. This is similar to the advice we already provide on farm machinery selection."

The farmer's DP requirements are not exactly the same as those of a small business. Russell's ADAS colleague Howard Westlake, who is responsible for software evaluation,

explains, "Double entry systems are virtually non-existent among working farmers, and ledger is a word which is simply not used. Farm systems tend to be oriented towards cash analysis, at cash time and not at invoice time. This makes debtors and creditors difficult to identify, and so they are usually recorded separately."

There are good reasons for this. Farmers don't just need information about their overall financial position — they also need both accounting and management information about individual farm activities, such as the milk yield, or the harvest of a particular crop. Each of these activities is termed an enterprise.

From a management point of view, enterprises have the unfortunate characteristic that results follow the dictates of the seasons rather than the demands of conventional accounting periods. For example, a crop of wheat might have a period of a bit less than two years between the purchase of the seeds and the eventual harvest.

To summarise, farm data processing systems have three different tasks. Firstly, they handle all financial recording, accounting and budgetary functions, in such a way as to provide the farmer with the information and documents he is used to as well as providing more conventional reports on a type that the farmer will hitherto have done without.

Secondly, the computer can facilitate control of individual enterprises by keeping detailed records of all relevant events and by producing management reports at regular intervals. Thirdly, it can do mundane calculational work such as payroll.

Peter Russell says that with this last category the benefits are not very tangible, and it would not be worth a farmer's while to acquire a micro for this sort of application alone. The other applications provide two kinds of benefits. First, they save time, worry, and possibly money. Secondly, they improve the information available to the farmer, by making it more detailed, more rapid, and available on demand.

One such system is the brainchild of a Hampshire farmer, Geoffrey Paterson. It was originally designed for use on a Hewlett-Packard minicomputer, but has been available since the Royal Show at the beginning of July, in scaled down form on a North Star Horizon micro. A company called Farmfax has been set up to market both systems.

The North Star system is priced at £4,990, for which the farmer gets a processor, a VDU, a printer, and two floppy discs. The software for one application. Other applications can be supplied at extra cost. The packages available include payroll, accounting, stable crop

farming and dairy management. Although the software was specifically written for the agricultural market, Farmfax director Simon Man reports that it has attracted "a great deal of interest in other small businesses where particular enterprises are to be monitored closely. For example, in a business with two offices, one is able to monitor the performance of both offices either separately or together."

A second system, also developed on a farm rather than by a computer company, is marketed by Farmplan, and is based on the Apple micro. The system is similar in terms of the applications it can handle, but is marketed in a rather different way.

Farmers can purchase the system, comprising a 64K processor, 128K memory, a VDU, and 80 column printer, plus all the software currently developed for it, for £1,650, plus an annual payment of £250. That sum is a sort of club membership fee, which entitles the farmer to any new software the company may develop, and a say in the choice of new development projects.

Although farm data processing is the subject of the most intense micro development activity, there is interest also in the process control possibilities, most notably the automation of the dairy parlour.

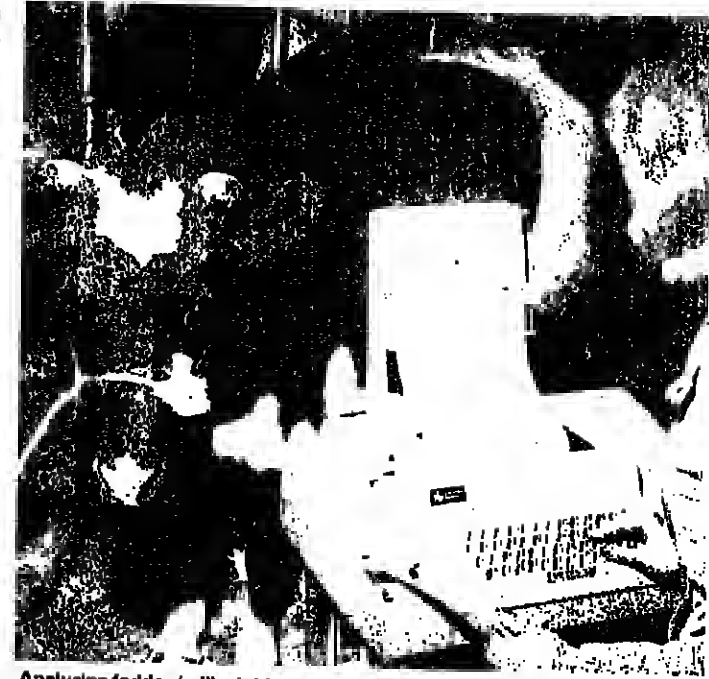
Of the several systems under development, a typical example is the AFMS/80 system, developed by Fullwood and Bland and currently being evaluated by ADAS at an experimental farm near Winchester.

This system not only measures the milk yield but also controls the dispensing of food and measures the body weight and temperature of each cow. The cows are identified by a signal transmitted from a transponder contained in a collar.

The computing power of the system is provided by four 64K Motorola 6800 micros, using floppy discs for data storage. As well as performing process control functions, the system can produce a variety of management reports, identifying for example cows whose milk yield is less than normal, or whose temperature is higher than normal.

Micros will almost certainly be used for other process control tasks in future. Possibilities already being considered include electronic potato sorting, control of grain dryers and glasshouse heating systems, not to mention various features on tractors.

At present the revolution is only just beginning. ADAS estimates that only about 100 micro based systems have been installed on farms so far, and most of them are hobby-type systems which have been bought by farmers to play with. But there seems little doubt, on the basis of the development activity taking place, that micros will make as big an impact on farming as on industry in general.



Analysing fodder/milk yield ratios with the help of a computer (Ironically a Bull-GE system). Today a micro could do the same job.

# COMPUTER WEEKLY is holding its Annual Ball on Friday, October 12 at the Royal Lancaster

Computer Weekly is holding its fourth annual Ball. Last year nearly 700 people attended what has come to be regarded as the computer industry's big night out.

This year the Ball will again be held under the patronage of the British Computer

Society. And proceeds will once more be devoted to a deserving cause associated with the computer industry.

So why not help us to help others? And at the same time enjoy a pleasant evening with friends and colleagues.

## Order form

Tickets are available at £17 for a single ticket. Included in the price is a dinner, cocktail and dancing until 2 a.m.

Please send me . . . . . single tickets at £17 per head (enter number required).

Please reserve . . . . . table(s) for me (10 places at £17 per head).

My cheque for £ . . . . . is attached. (Cheques should be made payable to IPC Business Press)

Please send the tickets to me at the following address:

Name  
Company  
Address

When completed this order form should be returned together with your cheque to: Chris Hipwell, Publishing Director, Dorset House, Stamford Street, London SE1 9LU

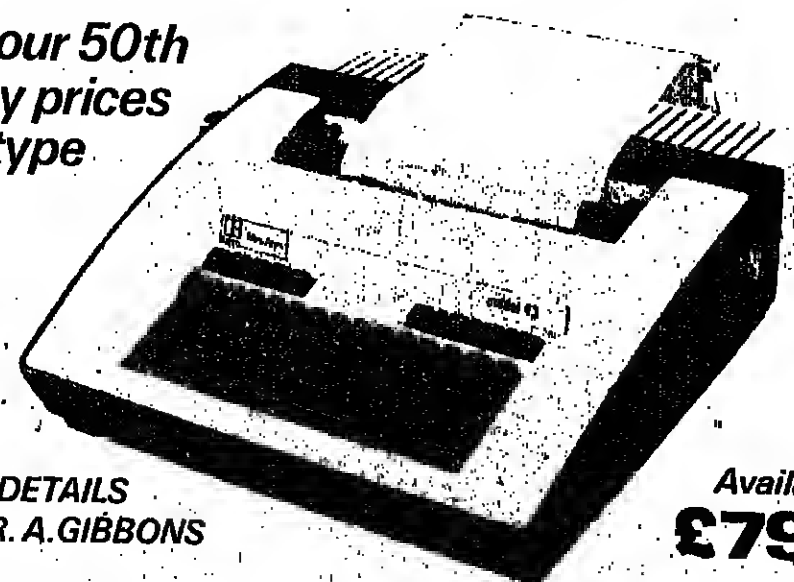


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The International Standards Organisation met in London earlier this year to consider standards for the interconnection of open systems. The rapid growth of networks and the increasing use of telecommunications by all sections of the community makes the early establishment of recognised international standards vitally important. Here FRANK TAYLOR, of Systems Technology Consultants and chairman of the British Standards Institution DPS/20 committee, who led the British delegation at the ISO discussions, reports on progress.

## ISO progress on open systems interconnection

DURING the recent meeting in London of the International Standards Organisation committee responsible for open systems interconnection, some, although not all, of the issues described in my earlier article (CW, May 24), were carefully considered, and considerable progress was made.

The two main activities dealt with were refining the model for a universal open systems architecture, and planning future work for this committee, bearing in mind the activities of other interested and similar bodies.

First of all the seven-layer model previously developed by the committee was confirmed but sub-layering was considered as a way of developing it to meet needs which might emerge at a future date.

The changes and refinements included consideration of addressing requirements within the upper layers, ie addressing particular users or terminals rather than lines or modes; and multiplexing — where, when, and how this should occur.

Another refinement, produced during the meeting was the division of open systems architecture into six primary components — these are data storage, integrity and security, data representation, program support, processing and allied resources, and data transfer.

A number of procedures involved in operating such a network architecture, were also considered. For example, the fact that communication between entities at the same conceptual level must necessarily appear via the next lower layer of the model.

The future work of this committee was carefully considered, and there was clear support for a proposal to seek authority to start standardisation work in the near future. This will involve changing the formal scope of the committee which will involve approval by its parent committee (TC97). It was generally felt that the time is now right to start standardisation work in line with the model which has been developed during the last two and a half years, in close co-operation with other ISO and allied committees with an inter-

est in particular parts of the architecture. These include TC9/SC8 and the CCITT.

New working groups were established during the meeting to align with the likely work items, and proposed work items were also formulated. These will now be sent to the parent committee for issue for a postal ballot, and hopefully, if a request of the UK is actioned, will be subsequently discussed at the meeting in November. The proposed work items cover the preparation of standards in line with the architecture and the various layers of the model, and covering the following areas:

1. The Reference Model. Although the present reference model is highly developed technically, there is a clear need to co-ordinate activities of other ISO committees which are covering sections of the open systems area, and to liaise with other bodies developing standards, such as the CCITT. In addition, the existing working paper may be processed as an ISO standard; this is a matter which will be decided later.

Over the next few years it is expected that the architecture will evolve to cover new applications, and to cover other areas based on computer technology, such as the inter-linking of word processors and facsimile transmission.

2. The Physical Layer. Here the basic problem is one of checking the compatibility and consistency of existing work with the model.

3. The Data Link Layer. Similar comments to those above apply to existing standards such as HDLC (ISO 3306 and 4335) appear to be close to requirements.

4. The Network Layer. Here a little more work may be required, since the control of data flow is packet switched and circuit-switched systems differ; and other issues need to be resolved.

5. The Transport Layer. Little standardisation work has been clear in this area, concerned essentially with the end-to-end transfer of specific sets of data relating to specific jobs or tasks.

6. The Session Layer. This is an area where considerable forward thinking has been done by

TC9/SC8 and its working groups, but there are no existing standards.

7, 8 and 9. Virtual Terminal Protocol, File Transfer Protocol, Job Transfer Protocols (three items). These bridge the upper two layers, and carefully structured standards, which satisfy users' needs and align with the model, will be needed. The term Job Transfer Protocols here refers to a universal version of RJE protocols excluding, at present, job control languages.

10. Management Protocol. This will need to include consideration of the type of liaison mentioned in the previous CW article and the management of transfers corresponding to such liaisons.

Some of these work items will involve comparison of existing standards such as X25 (which covers layers 2 and 3) with the requirements. Others, for example the session layer, will need to start from scratch in terms of developing standards. Certain protocols within the upper layer such as the VTP protocols may well build on Euronet work and other VTPs. The file transfer access and management protocols are very likely to build on UK work within the EPSS (now Post Office) Study Group.

All in all, this can generally be regarded as a successful meeting. Considerable progress was made towards getting work under way at the actual item level which will allow draft standards to be produced for comment and processing. The study phase which has formed the first major part of the committee's work can now be regarded as having passed through its first phase, and is substantially completed, although further refinement of the model will occur, including study of other important items such as vocabulary, formal description of protocols, and heading formats and principles.

It is to be hoped that this activity will continue in parallel with development of initial standards corresponding to those areas of the model which are fully defined, and on which standards can be based, and that authority to proceed will be forthcoming in November when TC97 meets in Madrid.

Several research projects are on the cards. One is the electronic journal planned to run on the Poly PDP-10 (CW, August 2). In addition to the usual means of distribution of the journal's information by dial-up terminals, it may become desirable to output on to WP systems or phototypesetting. Also, the Centre's own journal will be produced on the Wang, and retrieval software could be produced for this. In addition to distribution methods such as floppy discs and COM.

Painter also aims to explore the interface between the PDP-10 mainframe and the Wang, as

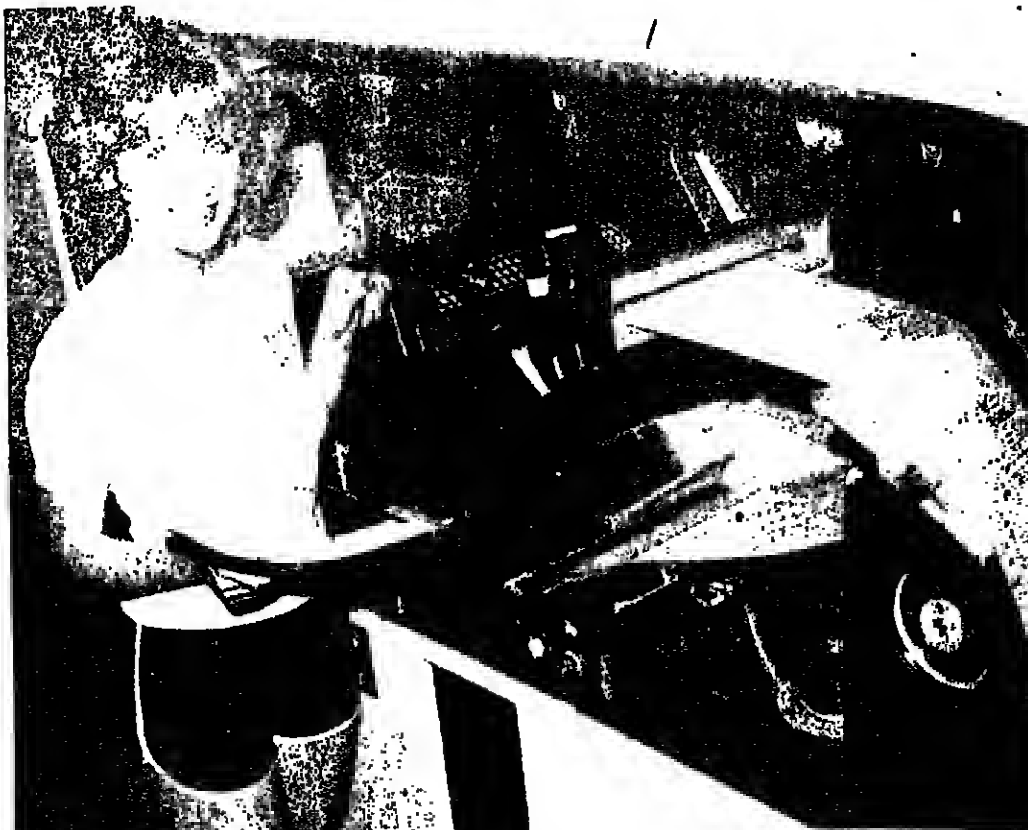
part of the broad trend of convergence of DP, WP, and communications. A hardware link would enable him to study the use of a word processor as an intelligent terminal to a mainframe, and would also provide a tie-in to microfilm by making it easy to send WP text to COM.

"Examining possibilities", he says, the basic idea.

The research will receive money from the British Library, but the Centre aims to make a profit from the sale of its services.

Asked about the Centre's prospects for competing against the enormous number of WP conferences that are being run at present, Painter commented, "I think the Meetings Industry balloon may burst very soon."

Exploring the use of WP as an administrative tool will be another of Painter's tasks, but he sees his most important job as dealing with the social aspects of new technology — finding out what jobs there will be and getting the ball rolling on training "a whole new generation of office workers to cope with the new gear."



### Firms offer laser printing

THIS month two firms in the North West have inaugurated bureau services based on the 20,000 lpm IBM 3800 laser printer. The firms are Image of Cumbria, Chorley, and LaserPrint, whose 3800 is seen here at the company's Manchester centre.

Apart from its speed, the advantage offered by the 3800 over conventional impact printers include the capabilities to mix type faces, to print bold characters, to superimpose graphical information like signatures and logos and to use A4 sized plain paper, all of which make the 3800 suitable for printing personalised letters at a rate of 10,000 per hour.

LaserPrint was set up by continuous stationery supplier, Continuum, and the mail order company, J. D. Williams. The host for the 3800 is J. D. Williams' IBM 370/148 which runs IBM software that enables it to handle print tapes from most types of mainframes and LaserPrint says that it is prepared to accept tapes from computer users all over the UK.

### Distributed processing systems added to Texas' mini range

FOUR systems, aimed at the distributed processing market, have been added to Texas Instruments' DS900 range of mini- and microcomputers. Three of them are based on two new OEM products.

At the bottom end is the DS900 Model 1, a single-user desktop system based on Texas Instruments' 16-bit processor chip. With two floppy disc drives it costs £6,480.

The second low-end system is the Model 2, a multi-user system which sells at £10,055 including two VDTs and two floppy disc drives. It uses the 1800/4 single-board computer, a new OEM product which is also based on the 9900 chip and includes 16K bytes of RAM, two asynchronous ports and logic for multi-processor working.

The other two systems are at the top end of the range, the DS900 Models 20 and 30, and are based on the other new OEM product, the 9901/12. This uses Texas Instruments' 40-bit bit-slice to achieve up to three times the performance of the 9901/10 processor used in earlier models.

An optional cache buffer for main memory priced at £2,300 can cut access time by nearly

half if programs are structured to take advantage of it. Basic OEM price for the 9901/12 ordered in batches of 25 is £13,440 each. This includes a processor with 256K bytes of error-correcting RAM.

Models 20 and 30 are pack-aged systems which start at £24,230 and £26,175 respectively. Model 20 comes with two VDTs and disc and tape backup storage, and can support up to 20 terminals.

The Model 30 can be configured with up to four 200-Megabyte disc drives, instead of the 50-Megabyte drives available on the Model 20. Both systems use the existing UNIX-like operating system, for which several new software packages have been released. Emulation of the IBM 2780/3780 remote batch protocol is supplemented by 3270 Interactive Communications Software, and Query-900 is offered as an enhancement to the DBMS-900 database management system. These cost £1,500 and £1,115 respectively.

A new operating system, the TXS, for the low-end DS900 systems up to Model 8, has also been introduced.

### Government slated over industrial control

A STRONGLY worded criticism of the UK's industrial control industry has come in a report published by consultants Larsen Sweeney.

Part of a series of summary reports on the UK electronics industry, it directs its criticism towards the "apparent gap between the UK government's ambition to revitalise the UK manufacturing base and the industrial control industry's ability to do the job."

The report suggests that "perhaps a sobering thought that much of the equipment needed to realise such an action will be imported, rather than produced here."

It is also critical of the government's negative attitude towards financial encouragement of new product development in the UK. The UK is now the only major Western government not actively encouraging such development, the report suggests, and in consequence a rapid decline in the manufacturing base for industrial control equipment is predicted.

Though the UK market for industrial-control systems is estimated to be rising at a compound rate of 8% per year, up to the 1985 time-frame of the report, Larsen Sweeney predicts that the industry's balance of payments deficit will grow by up to 31% a year.

RESULTS for Digital Equipment's last fiscal year, which ended on June 30, show that the company continued to grow at an impressive rate, especially in Europe, where turnover increased by 28% to \$66 million.

Worldwide sales grew by 20% to \$1,804 million, indicating that DEC's turnover in its current fiscal year should be well over the \$2 billion mark — only three years after passing \$1 billion.

DEC now employs 17,000 people worldwide, 1,200 of whom are in the British Isles.

Cinecom in North CINCOM, best known for its database management system Total, has opened a new office in Manchester. Responsible for the Midlands, the North and Yorkshire, its address is 12 Woodland, Manchester, Tel: 061 275 1111.

## DATA SYSTEMS NEWS

## ISSUE NO 8

# Power for the 80's!

In the computing environment of the 1980s, more and more users will demand independent, decentralised facilities and real-time data processing will become increasingly necessary for commercial as well as for scientific applications.

This shift towards real-time, distributed systems is already accelerating the erosion of the 'mainframe/minicomputer' distinction; a new breed of Superminis, with mainframe-style architecture and powerful, real-time operating systems, is moving to the centre of the stage.

### PERKIN-ELMER SETS THE PACE

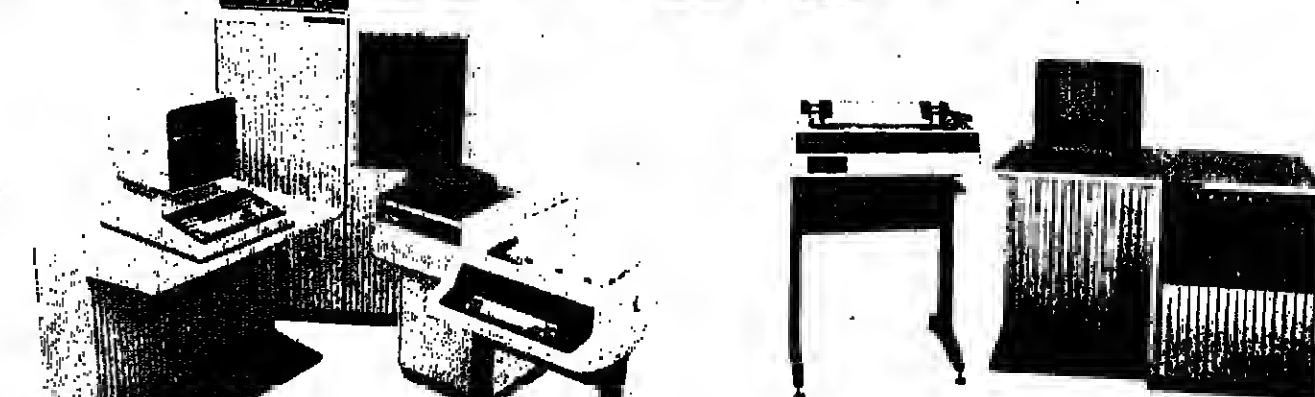
Perkin-Elmer anticipated this development as long ago as 1974, with the introduction of the world's first mainframe-style, 32-bit mini. Since then, the Company has continued to set the pace, with the first mini to directly address 1Mb of

memory, the first mini with 16 general purpose registers and the first mini with writable control store.

### EXPERIENCE THE KEY

Today, Perkin-Elmer 32-bit Supermini systems have established market leadership worldwide. The unrivalled range of mature 32-bit software products, proven where it counts — in the field — represents a massive 500 man-years of development.

When it comes to real-time data processing, there is simply no substitute for experience.



## 32-Bit Power

The recently launched Perkin-Elmer second generation Supermini, the Model 3220, significantly outperforms other minicomputers in its price range.

The Model 3220 will directly address up to 4Mb of MOS memory in 256Kb modules. There are eight sets of 16 registers, for a total of 128, each 32 bits wide with four levels of external interrupts.

### ACCURACY AND SPEED

Performed on a full 32-bit word, error correction is standard on the Model 3220. Using seven additional bits for each word in memory, all single-bit errors are corrected and all double- and most multiple-bit errors are detected.

A Loader/Storage Unit with watchdog timer is also standard. The L5U loads the automatic boot load program in the memory, which then loads the operating system from magnetic tape or disc.

Implemented in 2Kb of PROM, the boot load program also contains the self test which checks out

memory and certain processor functions before loading the operating system.

The Perkin-Elmer Model 3220 uses 1Kb of optional bipolar cache memory. With a hit ratio of 80%, a memory access time of 340ns is achieved. All high speed devices, such as mag tapes and discs are connected to an Extended Direct Memory Access (EDMA) bus, which gives a throughput of 8Mb per sec.

The Model 3220 supports up to 3024 devices with four user-selectable priority interrupt levels.

### EXTRA PERFORMANCE

The optional Floating Point Processor has 48 floating point instructions available for use. Also provided as an option are 2K words of Writable Control Store (WCS), which can be used to implement special mathematical or scientific algorithms, FORTRAN or COBOL RTL routines or any special functions in microcode. A complete set of WCS development software is also included.

System 1624, priced at £12,220, offers a processor with 64Kb of MOS memory expandable to 356Kb and a CP120 matrix printer, as well as all the other 1615 features.

## 16-Bit Power

The new Perkin-Elmer Series Sixteen, launched early this year, is a family of packaged 16-bit systems which are designed with OEM's and system houses, as well as end users, in mind. Designed to encompass a wide range of configurations, from entry-level to large-memory systems, Series Sixteen offers the latest technology and a level of computing power significantly greater than that of comparably priced products.

System 1635, top of the range at £20,360, offers maximum performance and data integrity. The processor has 128Kb of 750ns MOS memory with PDC, 10MB of disc, floppy disc interface and matrix printer.

An enhanced operating system and a full suite of languages have been provided for the Series Sixteen family, as well as a full range of high-level data communications products to allow communications with large mainframe hosts.

System 1624, priced at £12,220, offers a processor with 64Kb of MOS memory expandable to 356Kb and a CP120 matrix printer, as well as all the other 1615 features.

### Prices

Series Sixteen from £7,700

Model 3220 from £23,120

## Team Power

Perkin-Elmer Computer Systems Division is committed to providing the customer with the full range of services and the level of support which he is entitled to expect from a major computer manufacturer.

### COMPREHENSIVE SERVICES

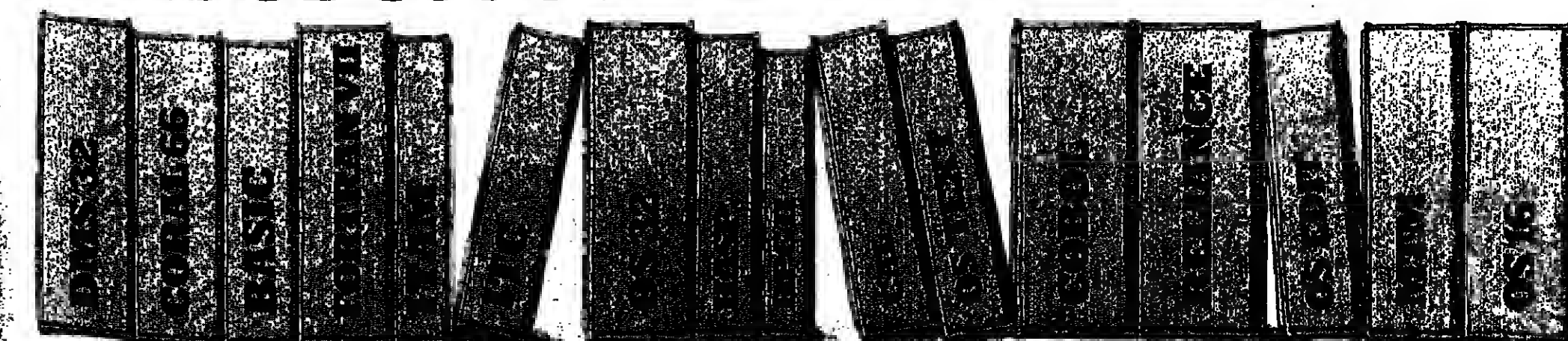
An experienced sales team is backed at all stages by a comprehensive support structure, which includes systems analysts, technical support and software services. An important component is the Slough-based Corporate Commercial Software Group, which develops standard commercial software products for worldwide distribution.

### USER SUPPORT

After-sales support is fully assured by a carefully selected and trained Field Service organisation and users are further supported by a professionally staffed Training Centre and by interchange, an active and diverse User Group.

Perkin-Elmer is, in sum, fully geared to deliver and support the most powerful and cost-effective minicomputer systems in the industry.

# Power Needs a Harness



Minicomputers are now challenging mainframes for sheer performance. But computing power is of little use unless it can be easily applied to the problem in hand. With Perkin-Elmer 16 and 32-bit software, you can really harness a price/performance combination that is unbeatable.

The extensive list of mature, field-proven software products includes the outstanding OS/16 and OS/32 real-time, multi-tasking operating systems, COBOL, FORTRAN, BASIC, MTM for multi-terminal program development, ITAM for data communications and a HASP emulator.

For Commercial Applications, there's the newly released RELIANCE, a complete software system for implementing transaction processing on Perkin-Elmer 32-bit Superminis, comprising an Integrated Transaction Controller, a Data Management System and COBOL.

RELIANCE ensures fast, easy and cost-effective programme development. Exceptionally high performance and reliability, combined with automatic system integrity, frees programmers to concentrate on application solutions.

For Scientific Applications, the superfast FORTRAN VII, designed to ANSI FORTRAN 77 standards, is globally optimising and offers comprehensive error analysis, a run-time library and a floating-point option.

To: Jane Berry, Perkin-Elmer Computer Systems Division, 227 Bath Road, Slough, Berks. Please let me have full information on:

Model 3220 ☐ Series Sixteen ☐ RELIANCE ☐ FORTRAN VII ☐

other products (specify)

Name

Position

Company

Address

Tel. No.

*Handwritten signature and date: J. Berry 1.8.79*

## Hatfield centre provides WP advice and research

THE National Reprographic Centre for documentation at Hatfield Polytechnic is starting an advice and research service for word processing to complement its established services in micrographics. To start the work the British Library has funded the purchase of a three-station Wang 25/2 word processor, which will be used both for experimentation and for producing publications.

Directing the WP work will be Derek Painter, who has recently joined NRC from Rotaprint, where he directed the develop-

ment from scratch of the Texta screen-based word processor. He and his staff will be providing advice on choosing and using word processors along the same lines as the Centre's service on microfilm and associated equipment, which has been in operation since 1967. Booklets and courses will be produced, and a course for managers on basic familiarisation with WP will be the first offering, in October, to be repeated three times a term.

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tronic journal planned to run on the Poly PDP-10 (CW, August 2). In addition to the usual means of distribution of the journal's information by dial-up terminals, it may become desirable to output on to WP systems or phototypesetting. Also, the Centre's own journal will be produced on the Wang, and retrieval software could be produced for this. In addition to distribution methods such as floppy discs and COM.

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For further information contact Jane Berry Slough (0753) 34511 • Tim Marlon Manchester (061) 928 8713

*Handwritten note: OTS 10/11/79*







# INTRODUCTION TO PASCAL

## How to deal with variations in records

### Part 8

RECORDS can have variations, and space for data can be found at runtime. This article explains how this is done in Pascal.

#### Variations in data

In most commercial applications, records on a file are not all identical. There are variations in the items included, based on factors such as sex and marital status (in an employee file) or type of account (in a banking system). An older language like Cobol provides for variations by allowing a record to be REDEFINED with another structure, but it relies on the programmer to set up and interrogate a key field which indicates which variation is in effect.

Pascal has the same facility but builds the key formally into the record structure. A record has a fixed part and a variable part (both are optional) and the variable part is introduced by our old friend, the CASE statement. The Flextime programs we have been discussing do not need this facility, but consider the classic example, a typical employee personnel record file. There will be several fields applicable only to married people and extra ones for married women (ie husband's name). Figure 1 shows how such a file would be defined in Pascal and Figure 2 gives examples of instances of possible records in the file.

Each record can only have one variable part, although there may be nested variations. Therefore, we could not have a tag to indicate how many address lines there are (in order to save space on the short ones) as there can only be one tag at each level.

#### Modes and pointers

Getting back to the Weekly file, we realise that it is going to

```

TYPE status = (single, married, divorced);
gender = (male, female);

person = RECORD
  name : string;
  address : ARRAY [1..4] OF string;
  birth : date;
  texnumber : integer;
  employnumber : identification;
  CASE marital : status OF
    single : ( );
    married : (children : 0..24;
               marriage : date;
               CASE sex : gender OF
                 female : (husband : string);
                 male : ( );
               END;
            divorced : (dependents : 0..24;
                       divorce : date);
            END;
END;

```

Figure 1. A person record.

contain a variable number of records each week and these have to be sorted before the update. Blaze Inc is a medium-sized firm and it is certain that an in-core sort will suffice for these very small records. Having read in the first record and remembered the week number, we can read in each of the other records and put them in their sorted position immediately. The details of the sort are left in abeyance; here we must consider how to store the records as they are read in.

Since there are a variable number, we do not want to declare an array. We want a structure that can grow as needed. Such a structure can be viewed as a linked list of nodes, each node being the accumulated information on one employee. The head of the list and a work variable are the only items that are declared at compile time, that is

```
VAR head, thisentry : node;
```

In a running program, these are allocated as pointers on the stack. The stack contains all the named variables. But we do not want to name all the nodes that crop up, so they will be allocated in the unnamed storage area called the heap. The heap is used as follows. A record is read in

```
VAR inputrecord : dailytime;
```

which resides on the stack. Next, space is created on the heap by means of the procedure called new. New grabs space on the heap

Fixed	JANE DALE 17 FOREST DRIVE BENTONWOOD 8863 7 8 1945 0321 MARRIED	ROGER TEMPEST FLAT 26 THE FIRB BUTON 8803 7 10 1951 1440 SINGLE	GAVIN FOX 11 HOLLOW CLOSE BUTON 8853 18 2 40 F017 DIVORCED
Variable	2 12 11 85 FEMALE HARRY DALE		0 11 11 73

Figure 2. Examples of variants

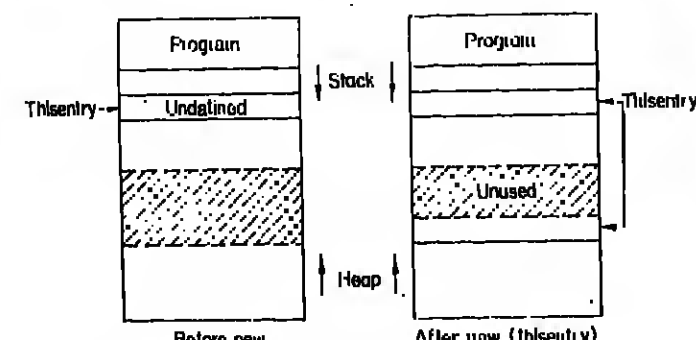
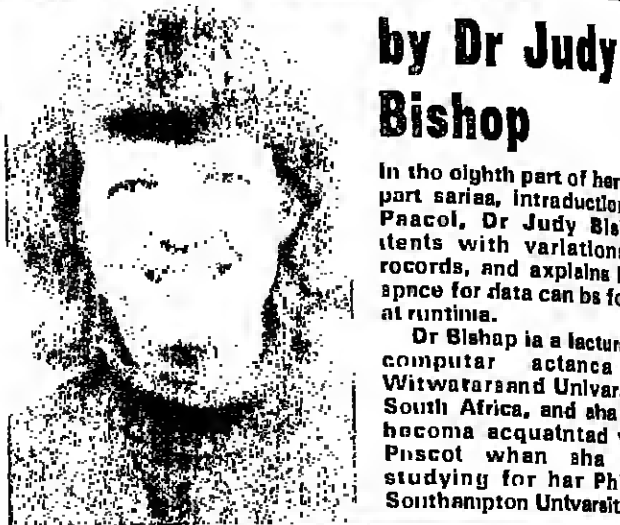


Figure 3. Creating a node.



by Dr Judy Bishop

In the eighth part of her 10-part series, Introduction to Pascal, Dr. Judy Bishop starts with variations in records, and explains how space for data can be found at runtime.

and sets the pointer parameter to point there. Diagrammatically, we have Figure 3.

#### Pointer syntax

Now, to copy the relevant fields from inputrecord to the newly created node we need to use the symbol ↑. Uparrow is sometimes written as → and stands for indirection. Suppose we define

```

TYPE node = RECORD
  number: identification;
  (*other times fields*)
  link : node;
END;
```

Then to copy the employee id read in to the one on the heap, we use

```
thisentry↑.number := inputrecord.employee;
```

This syntax mirrors nicely what actually happens. "Get thisentry. Follow the pointer to the node and select the number field. Assign to this the contents of the employee field of inputrecord."

#### Forging links

With pointers, we can easily create linked lists by saying

```
thisentry↑.link := head;
head := thisentry;
```

These techniques are used universally but very often implemented by means of arrays. Pascal's pointers allow the linking to be done in a far more direct manner, besides providing the additional advantage of storage on demand.

**NEXT WEEK:**  
**Part 9: Loose ends. The remaining features of Pascal and the current position on standards.**

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## Intel moves out of low profit areas

REVENUES for the first half of this year at Intel have jumped 67% over the same period last year, while earnings rose even more, up 74%, reflecting the company's move out of product areas where profit margins are low.

The company's figures were: Revenue \$290.5 million, and profits after tax \$33.9 million, which represents \$1.59 per share.

For the second quarter of 1979, revenue was \$155.2 million, up 66% on the corresponding quarter in 1978, while earnings rose to \$18.7 million, a jump of 75%.

Over the past year Intel has made a conscious move out of product areas where the competition is fierce and the margins low.

It is concentrating its efforts instead on devices such as static memories and its microprocessor product range, where the margin is much higher and the competition less aggressive.

# Would service bureaux rather fight than switch?

MINICOMPUTERS have been perceived as a threat to the service bureau industry, and to date the service bureaux have reacted defensively against the enemy. In reality distributed processing and minicomputers represent a significant opportunity for service bureaux, and when products are properly planned can ensure a customer's long-term commitment as a services client.

Factors preventing the entry of minis into the services arena by service companies themselves are primarily psychological. Technical issues for the most part are minor and readily resolved. This article deals with the psychological factors and describes the basic technical characteristics needed to satisfy a service bureau market.

The initial reaction of service companies to minis is to reduce charges to customers. This reaction is detrimental to service bureaux since the lowering of price only affects the profit of the services vendor and has no impact whatsoever on the minicomputer vendor's strategy. The margins provided in the development of stand-alone mini systems as a consequence of advances in technology are large enough to withstand price pressures.

Microprocessors will allow mini vendors to lower hardware costs while protecting their investment in software. An initial psychological adjustment that service companies must make is to accept the fact that while certain businesses are a natural for a mini offering, minimal effort should be spent trying to salvage businesses that are unprofitable, especially if they are unprofitable on a cash flow or incremental basis.

Key to disc applications, word processing and certain text editing applications which can be accommodated with the advance versions of Wybur-type extensions to IBM operating systems are best kept on minis. The resources required to accommodate this market are significant and cannot be recovered at competitive price levels.

The CPU usage and revenue as compared to the total resources needed to accommodate these types of application is small. Initially it may appear that these applications which require large amounts of mass storage, and which historically have been very profitable, may no longer be viable since pricing pressures within the industry are causing the incremental profit margins of mass storage to be continuously reduced. Here, advances in disc technology are forcing reductions in the price of disc storage.

Service companies cannot be "everything to everybody" and must carefully assess their markets, even the segments which are thought to be certain sources of revenue. This consolidation of the thinking of sales personnel, and retraining,

often results in a loss. Selling a few copies typically leads to small profits. The third major psychological hindrance to the use of minis is the mystique that has been created around teleprocessing. Striving for the ultimate in communications is not only very intimidating to management, but costly and unnecessary in today's market. The ultimate never gets to market. It remains in the laboratory.

Vendors should start with basic telecommunications techniques and proceed to expand their network as a function of realistic market demands and with minimum impact on host resources. In the services field, business communications beyond the host, ie communications emanating from a mini, should be the primary growth pattern.

This makes optimum use of the mini's resources while ensuring a continual relationship with the host for processing power. In addition, it personalises the network to the individual customer's needs, and minimises the impact on host resources. Finally, pricing is simplified, since costs can be directly identified with the user, his particular application, and his use of the system.

In addition to the psychological barriers that hamper the acceleration and integration of minis into the services vendor's offerings there are psychological pressures in the market that favour the acquisition of in-house mini systems. Today's computer user, even if it is his first venture with computers, wants some capability on his premises and under his control.

Clients have acquired a strong appetite for on-site equipment which is more capable than the basic terminals that merely read

cards and print reports. The cost of an intelligent terminal that can perform as a computer, as compared to that of a basic remote job entry terminal, is very small.

Security, program development, and operational control are some of the preachings of mini vendors. On the other hand, the naive computer user has little or no appreciation of the real costs associated with having his own computer, and only after the initial decision to acquire a system has been made and after the system has been installed are the true costs recognised. By this time it's too late, and often too embarrassing, to change.

Users of service bureaux would welcome having their service vendors provide their migration from the early teletype-compatible and remote job entry terminals to "some offering" that bridges the gap between a full-blown in-house system, and something with intelligence that can fulfil the dual capability of local processing and selective use of the large host system.

Reliability is another factor that works in favour of stand-alone mini procurements. Today's minis are much more reliable for technological reasons, and also because the operating software is typically less complicated.

IBM's withdrawal from the service bureau business in the US has probably accelerated the company's development of small system offerings and has resulted in the single most significant force in small system sales. Advertising campaigns aimed at the small system user have been intensified, and continually stress business-related benefits. Furthermore, small business systems are a natural extension of the office products offering and can be handled in a low-key manner. Examples of markets that

typically represent excellent opportunities for a combination services and mini offering include:

- Connected by geographic location: Users are concentrated within a small geographic boundary. This boundary can be limited to the confines of a building, building complex or state boundaries.
- Dial-up service: Users can use dial-up telephone service to access the mini system. This implies short distances and short

duration messages. In certain cases where the geographic area is very small, dedicated lines can be more practical than dial-up. In the final analysis, this becomes an economic decision. The technology is proven and easily implemented.

Transactions: Applications that use inquiries into database files, with the generation of appropriate transactions, are prime for the dual product offering. Optimum applications are those which have minimal activity per given record in a processing period.

The product characteristics that are needed properly to integrate the two offerings, services and minis, are:

- Files: Files between the large host system and the minis should be completely compatible, or at the very least any file incompatibility should be completely transparent to users.
- Loading: The host system should be able to download the mini with databases, and also, upon command, be able to retrieve files from the mini.
- Products: Programming language

The factors that hinder service companies from becoming involved with minis are mainly psychological, says A. CHACHARONE, who defines here the main problems and advantages in adding minis to the bureau's repertoire.

Chacharone has been in marketing with CDC for a total of nine years, and at present is working for CDC Greece in Athens.

ages on the mini should at a minimum be a subset of the languages used on the host, and completely usable on the host with, at most, control card changes. This would provide immediate back-up capability which the mini vendor cannot offer.

Communications: The mini must have an excellent telecommunications capability, primarily in the area of low-speed telecommunications. The capability should cover the spectrum of 30-1,200 cphs terminals with a protocol completely compatible with the host's. In certain applications, economics may dictate the need to handle clusters of terminals functioning through a localised concentrator.

Local government: Many councils are not large enough to justify a large data processing system and very often enter into shared relationships for the acquisition and use of data processing systems. Applications such as personnel records, payroll, and utility bill processing are a small sample of the types of application which could be integrated very conveniently in a mixed mini and large host offering.

Computer-based education: Teleprocessing costs will not permit the direct communication with a large host typically required to satisfy the need of the CBE market. This is especially true in Europe where telecommunication technology lags behind the US standard and costs are considerably higher. A practical solution would be to provide a mini which contained the specific courseware in use and could control a small number of CBE terminals.

Scientific: The scientific community, typified by pre- and post-processor processing coupled with large analytical systems, is another major market that can be served with a carefully planned mini and large host offering.

In conclusion, the services vendor's success can be optimised as long as perpetual relationships are developed with the clients. Minis can be a reason for a long-term relationship.

The services vendor should be prepared to assume responsibility to manage the maintenance function, provide training and provide professional services to the user. In other words, the services vendor should provide "one-stop shopping" and not force the user to search and sub-contract separately for the services needed to have an on-site system.

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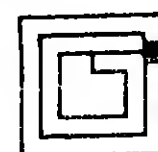
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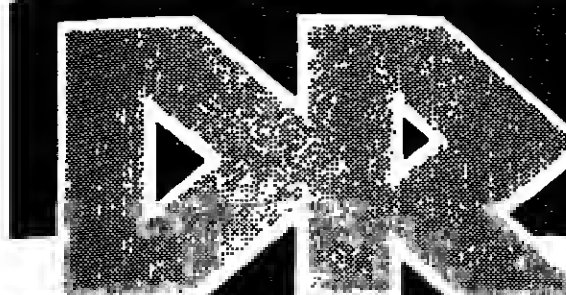
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First-class opportunities for analysts with 2 or more years experience of commercial/financial systems. Large installation background would be advantageous. (Ref DR/47) 10 **£6500**

**Programmers**  
COBOL programmers with a minimum of 1 years experience required in progressive installation. Career development prospects and company benefits are excellent. (Ref DR/48) 10 **£5800**

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**Systems Analysts**  
Analysts are required by a major international organisation. Candidates should have about 1 years analysis experience plus 2 years programming. (Ref DR/49) c **£5500**

**Systems Programmers**  
This client seeks systems programmers with a good IBM background. Particular knowledge should include OS/VS and some ASSEMBLER. (Ref DR/50) c **£5000**

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This company has a number of vacancies for programmers at all levels of experience. Good graduates with no previous experience would also be considered. (Ref DR/51) 10 **£5000**

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ICL MTS Communications — Midlands  
Ventak DataShare — Midlands/London  
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(Graphics and Communications)

To join a team which will be responsible for design and implementation of the software for the graphics laboratory. The successful candidate would also be able to take part in all developments concerning the Centre's communication network.

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Informal enquiries may be made by phoning Middlesbrough 224170. Extension 12. Application forms and further particulars may be obtained from: The Personnel Section, Teesside Polytechnic, Borough Road, Middlesbrough, Cleveland, TS1 1BA. (Middlesbrough 244120). Extension 15. Closing date 31.8.79.

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To identify and develop product areas relating to IBM mainframes. A strong commercial systems background, a thorough knowledge of IBM and compatible systems and leadership experience is required. Ref. MB/2651.

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Grade: AP.4/5 £4844-£5547

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Applicants should have at least two years' programming experience with PL/1, including the use of structured programming and program design language, and also have experience as a Systems Analyst.

The installation comprises an IBM 370/138 operating under OOS/VS, with local and remote terminals using CICS/VS, and on-line programming using SPMOL.

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Job description and application form, returnable by Friday, August 31, 1979, are available from City Treasurer, Guildhall, Plymouth, PL1 2AA.

oxford polytechnic

Computer Centre

## COMPUTER SHIFT LEADER

Applications are invited for the post of Shift Leader. The successful applicant will be required to lead a team of Operators responsible for the Centre's computers. Equipment currently installed consists of ICL 1903T, running under GEORGE 2 and MAXIMOP. Additionally it is expected a dual-processor Prime computer system running PRIMENET and supporting B4 terminals will be installed later this year.

Applicants should be educated to 'A' level standard, and have experience of operating in a medium to large computer installation. A two-shift system is worked, and the salary will be within the T3 scale, £3420-£5834 plus £312, an additional 14% shift bonus is also payable. (Subject to review from July, 1979).

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A programmer with at least 18 months RPGII experience in a 2800 installation is needed to work on commercial systems. Small friendly team.

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Alternatively, write with brief career details (no stamp required) to Lorien Computer Services Ltd., FREEPOST, Leeds LS7 3YY.

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### UNIVERSITY OF BIRMINGHAM THE COMPUTER CENTRE

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To help support these extended services applications are invited from graduates for the following posts:-

#### 1. COMPUTER OFFICER Operations Group

to assist with the management of the DEC 20 installation, to provide technical hardware and software support in the area of telecommunications and overall involvement in the selection, design and construction of specialised hardware.

Candidates should have management ability and several years proven experience in the design of digital or telecommunications systems.

#### 2. SENIOR HARDWARE ENGINEER Operations Group

to be responsible for the day to day running of the technical workshop and the construction and maintenance of equipment associated with the network.

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This new Computer Officer post has been created in the User Services Group to develop the practical application of

\* CAL and CAL techniques \*

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STARTING SALARY FOR COMPUTER OFFICERS, ACCORDING TO AGE, QUALIFICATIONS AND EXPERIENCE, WILL BE ON THE SCALE:

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Further particulars are available from the Assistant Registrar, Science and Engineering, University of Birmingham, P.O. Box 363, Birmingham B15 2TT, to whom applications (3 copies) including curriculum vitae and writing samples should be sent by 21 September, 1979.  
Please quote reference: C21.

### WESSEX REGIONAL HEALTH AUTHORITY

1900 Systems/Programming

Applications are invited from suitably experienced Analyst Programmers to fill a number of vacancies at our Computer Centre based at Winnall, Winchester. Experience of COBOL, ICL 1900 and 2803 Computers, George 3 and NCL standards will be taken into consideration when appointing to the following grades:

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There is a network of District based ICL 2803 computers and 7502 terminal systems linked into the main computer, a 1903T running under George 3.

Further details and application forms are available from the Personnel Department, Wessex Regional Health Authority, Highcroft, Ramsey Road, Winchester, Hants. Tel. (0982) 83511, Ext. 380.  
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### Contract Requirements

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ICL 2800 ANALYST/PROGS  
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To apply for any of the jobs below or for further information, please telephone the consultant concerned during working hours on 01-242 9350 or write to the above address. If it would be more convenient to telephone in the evening, or at weekends, the telephone numbers are: Renée Nute/Fran Setter - 01-874 6372 Sarah Hurn - 01-673 0205.

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- Experience in COBOL or PL1
- Greater London area

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Ref: 399/CW/Sarah Hurn.

### £6,000 - £7,000 W. London

This is an excellent opportunity to join a new Software Application Group set up by a major computer manufacturer to provide service to clients. Candidates should have a good commercial background on minis, preferably in COBOL or ASSEMBLER. Alternatively communications experience on minis would be useful. Promotion prospects to Systems Analyst are very good.  
Ref: 173/CW/Fran Setter.

### £7,000 - £10,000

A London based Project Manager position calls for the following background:

- 5 years experience including 2 years systems analysis.
- Some degree of responsibility within a project environment and the potential to become a junior project manager, OR previous achievements as a project manager.
- A knowledge of ICL equipment would be useful but is not essential.

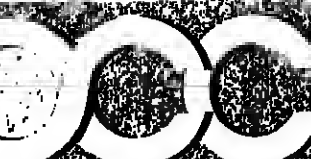
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Ref: 200/CW/Anna Senior.

Herts - Development Programmers are required by a computer manufacturer to work on the system software for a multi-processor. Key to Disk and distributed processing system. Candidates should have experience of system design and implementation. Salary £4,500-£8,000.  
Ref: 201/CW/Karen Rizzello.

Reading - Graduate programmer required for the Military Systems Unit of a Software House. The successful candidate will have a minimum of 2 years Real Time programming experience (preferably Assembler) on minis. Salary c£5,000.  
Ref: 202/CW/Anna Senior.

Surrey - Due to expansion the Management Services Department of a large electronics group requires Programmers. Candidates should have 3-4 years commercial COBOL experience on an ICL 1900 ideally using G3. Salary £5,600-£6,600.  
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Ref: 171/CW/Fran Setter

### to £7,000

Our clients are an established multinational company with subsidiaries in the UK and Europe. They are known as specialists in conversion systems although some of their computer projects are in other areas. We are looking for a programmer with a very good technical background and a knowledge of COBOL on any mainframe to join a team, based in Surrey. The successful candidate will have the opportunity to gain experience on all major mainframes. In addition to first class conditions and financial rewards, there is the opportunity to travel in the UK and Europe.  
Ref: 173/CW/Renée Nute or Fran Setter.

### Systems Analysts (Customer Support) London E.C.1 base c£8,000 package

Due to the success of their small business computer, an international computer manufacturer is expanding its marketing operations in London. Systems Analysts are required to complete the team and to provide support for this new product by way of pre sales investigation, presentations and recommendations of appropriate commercial application packages together with responsibility for implementation and installation. Applicants should have experience of design through to implementation of commercial applications, preferably in a mini environment with either a User or a manufacturer. Excellent career prospects and benefits package are offered.  
Ref: 171/CW/Fran Setter.

### Systems Analysts (Financial Systems) c£9,000

An international company based in London is looking for an experienced Analyst/Programmer to join a team redeveloping their internal financial systems. These include machine accounting, invoicing, purchasing and management accounts, using sophisticated techniques for batch and interactive access. They provide a bureau service on large IBM and CDC mainframes, and the successful candidate would be expected to be able to move on to the bureau side when the internal project was completed. The ideal person will have developed and designed financial systems, but if he or she shows sufficiently high potential, this is not a drawback. Communications and interactive skills are equally important, as the candidate will be expected to work closely with all levels of management. Benefits include an incentive bonus and profit sharing scheme.  
Ref: 480/CW/Sarah Hurn.



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## Controller (Designate) of Computer Services

Solihull

up to £10,683\*

West Midlands Gas invite applications for the above post which is based at their Regional Headquarters, Solihull.

The man or woman appointed will be responsible to the Deputy Chairman for the management of the Computer Services Department, involving Systems Design and Programming, Computer Processing, and Data Preparation and Control.

The installation currently comprises an I.C.I. 2972 and two I.C.I. 2960's. The latest ancillary and peripheral equipment is in use and there are at present some 150 V.D.U.'s throughout the Region.

Applicants should have an appropriate degree and/or a professional qualification, together with management experience at a senior level. Close co-operation with, and an understanding of the needs of, user departments is of particular importance.

\*Salary up to £10,683 p.a. (under review) plus current self-financing productivity payment and the benefits normally associated with a large progressive organisation including re-location assistance where appropriate.

Applications giving full personal particulars and career details should be sent to: Director of Personnel, West Midlands Gas, Wharf Lane, Solihull, West Midlands B91 2JP.

Closing date for applications August 30 1979.

**WEST MIDLANDS GAS**

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Abu Dhabi, U.A.E.

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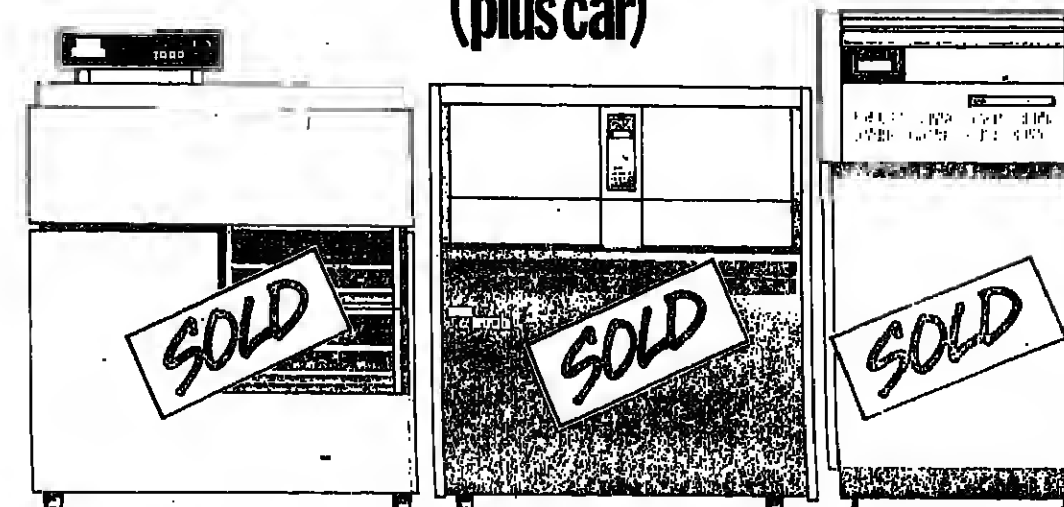
A mature, diplomatic attitude is essential to build client confidence. General efficiency and sales awareness to maintain service profitability could be rewarded with promotion.

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For further details contact Jim Shaw at CDS, or on 0990 24546 evenings/weekends.

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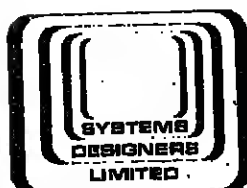
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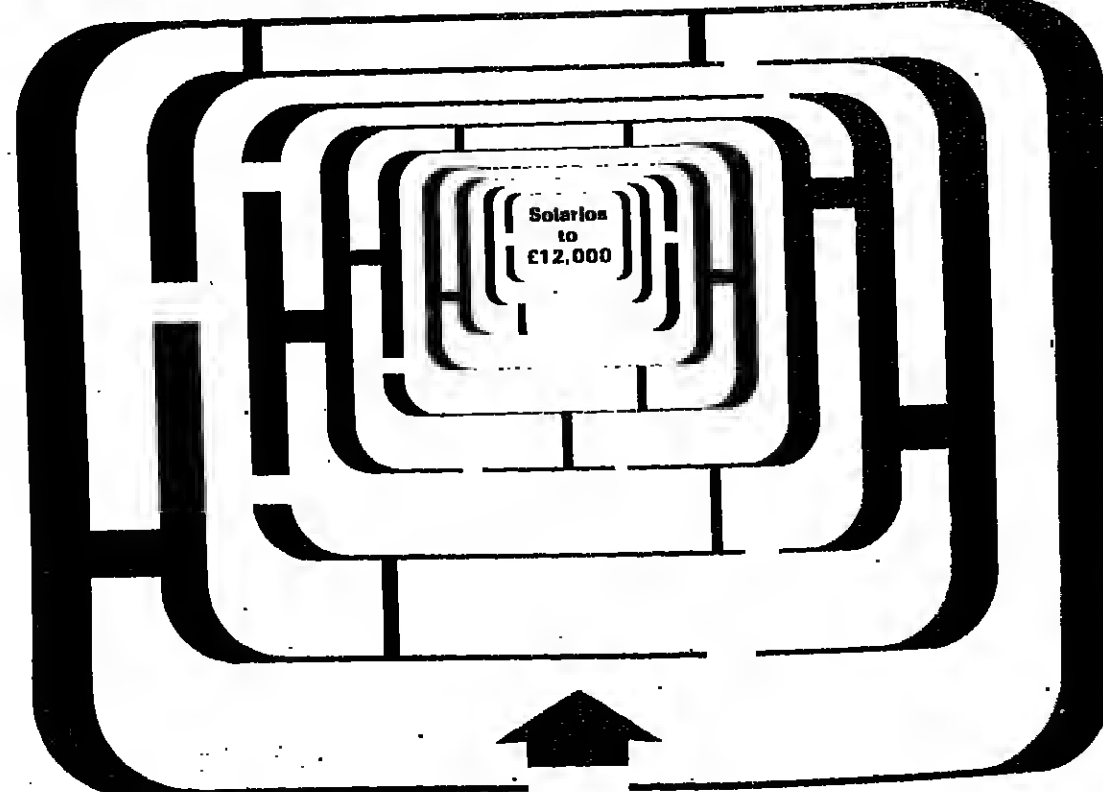
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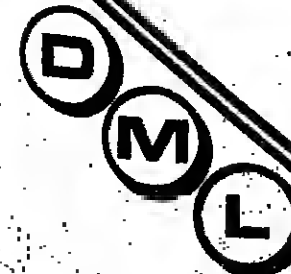
The benefits of planned training and career development are considerable. As well as gaining valuable on-the-job experience, candidates can expect a thorough grounding in systems techniques and progress into the systems area.

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Location interviews will be carried out in major centres throughout the U.K.



Tesco Management Services Limited is a newly formed Computer Services Company, a wholly owned subsidiary of Tesco Stores (Holdings) Limited.

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With considerable experience of at least one IBM operating system and a good knowledge of COBOL, Assembler and OS or DOS JCL. You should have good communicative skills and a high degree of professionalism, and have demonstrated that you can cope in a variety of different environments.

You must be ambitious and be prepared to work as part of a small but highly motivated team. The positions are based at Cheshunt but you must be prepared to work away from home as required.

### SENIOR PROGRAMMERS AND PROGRAMMERS up to £7,500 pa (dependent upon experience)

You should have solid IBM COBOL and JCL experience and a knowledge of Assembler or 1900 COBOL would also be an advantage although not essential.

You will be working in a small team environment but you will be using TSO as your main program development tool and will be working on a variety of systems for different Clients.

The positions are based in Cheshunt but there may be opportunities for working on site at

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The Personnel Officer  
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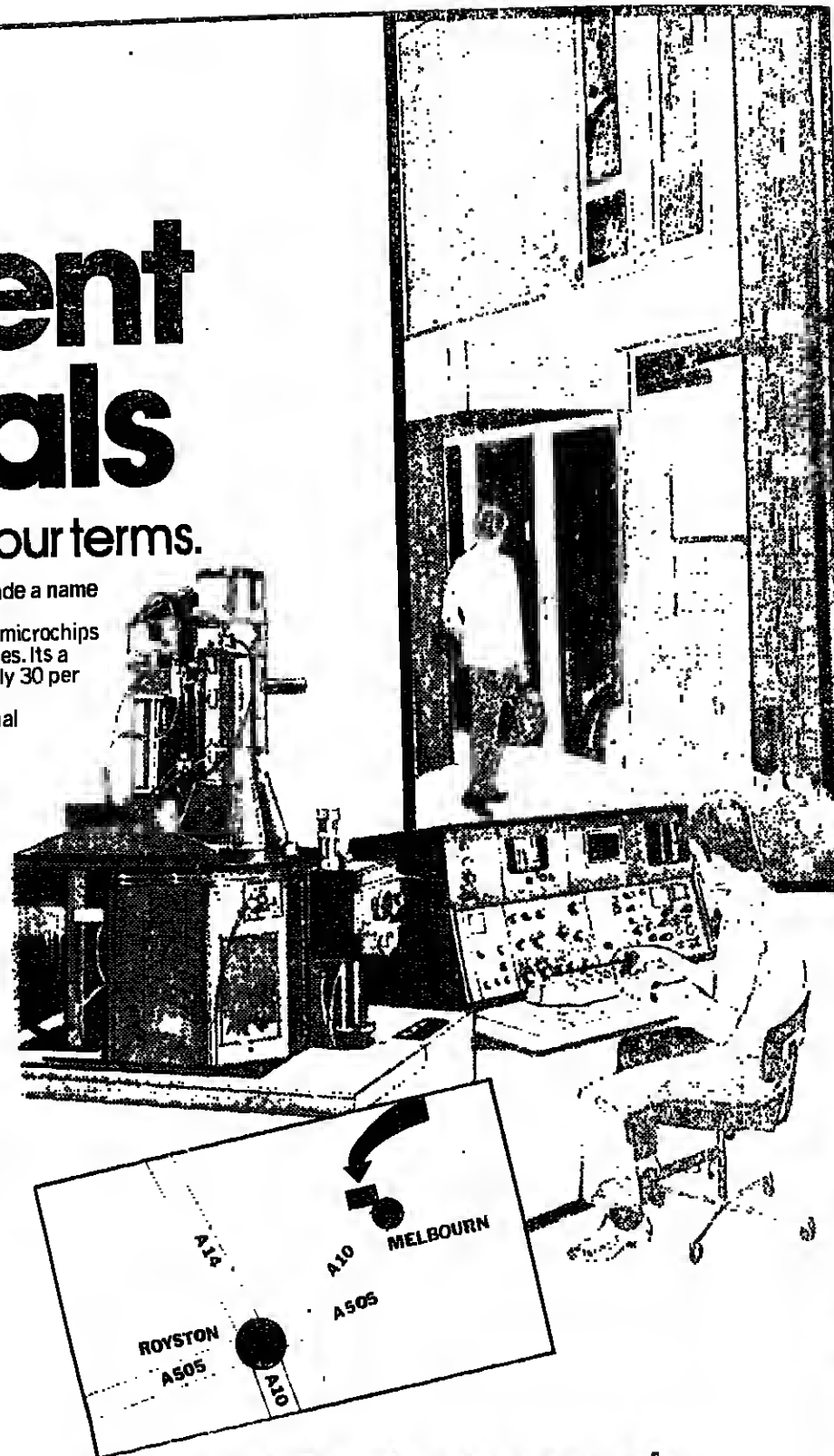
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Cambridge Instruments

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(Ref F 29)

Salary up to £8,946 (inclusive)

The successful candidate will be responsible to the Chief Administrative Officer for developing the use of the present computer terminal as well as developing the use of computer techniques within the Department. The Council's computer is an ICL 1903T 128K installation and is under the control of the Borough Treasurer. The person appointed will be based in the Architect's Department at Arbury Road SE20.

The successful candidate must have considerable experience with computer techniques and be able to write programmes dealing with technical subjects. Therefore, a qualification in the building industry would be desirable.

In approved cases, awards will be given towards reasonable removal and resettlement expenses. Commencing salary depends upon age, qualifications and experience.

A 19-day, four week cycle of hours is in operation.

Closing date 31st August 1979.

Application forms from Assistant Chief Executive (Municipal), Town Hall, Bromley BR1 1SR Tel 01-464 3333 Ext 3318.

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If you can't make it, please telephone or write, quoting ref. M/W1, to:

**Norma Cozens at the Middlesex Office**  
01-578 4563 or

**Iris Norman at the West End Office**  
01-222 3521

Just choose the venue nearest to you.

**Caledonian Hotel,**  
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**CMG (Middlesex),**  
Westway House, 320 Ruislip Road East,  
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## ANALYST/PROGRAMMER

London

up to £6214

The Computer Services Department of British Gas is looking for an Analyst/Programmer to join its Data Handling Section. This Section designs and develops information systems which simplify operational definitions of technical and commercial application areas.

A varied programming environment is available based on Univac 1100/21, and ICL 2902 hardware. Conventional high level languages of COBOL and FORTRAN are extended by means of Cadasyl and DMS 1100, ICL 1100MS database and interactive Query languages to meet the needs of individual applications.

Applications are invited from candidates with a degree in a numerate subject together with practical experience of developing systems using FORTRAN or COBOL within a large operating system environment.

Starting salary will depend on qualifications and experience but will be within the range £5335 to £6214 (including Inner London Weighting). In addition to salaries quoted, there is currently a Self-Financing Productivity Payment.

For further details and an application form, contact the Research Secretary, British Gas, London Research Station, Michael Road, Fulham, London, SW6 2AD, quoting reference LRS/31a.

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## WALSALL METROPOLITAN BOROUGH TREASURER'S DEPARTMENT COMPUTER DIVISION

## SYSTEMS ANALYST (£5220-£6090)

The division is responsible for developing, operating and maintaining systems for all departments of the Authority. The mainframe equipment consists of an ICL 64K 1902T and Communications equipment. Data preparation is via a G.C.S. key to disc system; remote terminal equipment includes a 7502 system and 931 terminals linked to 1500 processors. The GEORGE 2 operating system is used together with COMMS. MANAGER and DRIVER for the real-time applications. The programming languages used are COBOL and PLAN.

Application forms from the Treasurer, Walsall Metropolitan Borough Council, Civic Centre, Walsall, WS1 1TW, or telephone Walsall 21244, Extension 2840. Closing date for applications is Thursday, 30th August, 1979.

## HEAD OFFICE

## TERMINALS SUPERVISOR

Salary: £3,867-£4,184 (+ £312 p.a. supplement) (Pay settlement imminent)

You will be required to act in a support role to divisions on all aspects of computer operations work and terminal operating. Considerable experience of ICL terminal equipment is required. The duties of the post will involve a certain amount of travelling for which a regular user car allowance will be payable.

Application forms from The Director of Personnel & Management Services, North West Water, Dawson House, Great Bank, Warrington, Cheshire WAB 3LN.

Tel: Pinketh 4321, Ext. 64. Closing date for applications: 24th August, 1979. The above post is open to men and women.

North West Water

# GEORGE 3 SPECIALIST

Home Counties

c. £8,000

Our client is the largest and most progressive ICL based bureau in Europe. Offering a complete range of computer based services with a nationwide communications network they are growing at the rate of 50% per year.

They are currently seeking to recruit a George 3 specialist who has the ability to provide the George 3 expertise for internal requirements who can also act as a consultant for both customers and prospects.

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If you feel you have the necessary experience and wish to join a highly successful and professional bureau services company telephone or write quoting reference 2554. Mann Management, 124 New Bond Street, London W1. Tel: 01-409 1371.

MANN MANAGEMENT

01-409 1371

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(with experience of any large mainframe)

UP TO £5608

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good training facilities for management and technical skills.

## OTHER BENEFITS

Wide range of relocation allowances, pleasant working environment, staff restaurant, free car parking, staff club facilities — Bar, discos, squash, tennis, golf, etc.

If you have at least 9 months' experience and are interested — phone or write (with details about yourself) to — **PETER BROWN, Computer Services Division, County Hall, Kingston Upon Thames. Tel: 01-548 1050, Ext. 3478.**

SURREY COUNTY COUNCIL

COMPUTER SERVICES

## International Oil Exploration and Production PROGRAMMER

Unionoil Company of Great Britain, a subsidiary of Union Oil Company of California, wishes to engage a Programmer for the Computer Services Department at the Sunbury-on-Thames Head Office. This position, in a recently established department, offers a unique opportunity for professional challenge and scope.

Initial responsibilities include commercial programming for accounting and management information reporting systems. Candidates should have 'A' level qualifications and two to four years' experience with Cobol. Familiarity with Fortran or Basic would be an advantage.

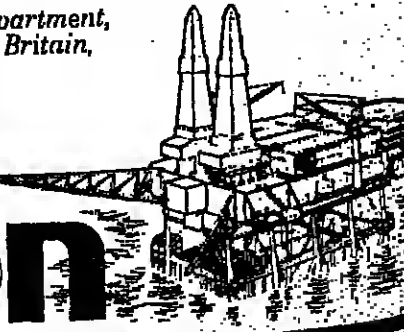
This position offers an excellent salary and benefits package and interesting career opportunities with an international oil exploration and production company.

Additional benefits of this position will be the experience gained on our in-house computer, which currently controls an on-loc and multiple site environment.

Interested persons should respond in writing to the address below. All responses will be held in strict confidence.

Administrative Services Department,  
Unionoil Company of Great Britain,  
32 Cadbury Road,  
Sunbury-on-Thames,  
Middlesex.  
Telephone: Sunbury 85600.

UNION 76





## SYSTEMS ANALYST

NW3

to £7000

Our clients, a national Transport organisation, whose Head Office is in Swiss Cottage, wish to recruit a SYSTEMS ANALYST with experience of IDS and TDS, to work on their HONEYWELL 66/40 installation running under GCOS.

The successful candidate will be of good educational standard and will have been involved in the design of at least one major on-line project. A programming background (ideally COBOL on Honeywell equipment) would be preferred.

The company is part of a very large corporation offering excellent career prospects to the right candidates.



## Irish System Programmers required by the successful Company with successful products in great demand.

We need enthusiastic junior and senior OS/VS System Programmers to join our Customer Support Team.

If you are interested in achieving high earnings and a professional challenge contact us immediately.

Extensive product training will be given in California, U.S.A. and at our European Offices.

Products include: SECURE - RESOLVE - TONE - CMF - CONTROL/IMS - CONTROL/CICS.

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5, Herbert Place - Dublin 2 - Ireland. Tel: 01-789969 - Tlx: 30440.

Offices: Dublin, Düsseldorf, Paris, London, Milan, The Hague.

## Operations Training Officer

£6585-£6948  
(Including London Weighting)

LOLA (London On-Line Local Authorities) provides computer facilities for a consortium of four large London Boroughs. The Computer Centre is situated in modern premises at Enfield and current equipment is a 4-megabyte IBM 370/158AP running IMS/VS and MVS.

An Operations Training Officer is required to ensure that new entrants to the Operations Sections, as well as existing staff, have suitable, planned training in the many and varied applications we process, as well as in our hardware and software.

Applicants should have extensive operating experience (including two years at a senior level) in a large IBM (preferably 1 p.) environment, the ability to communicate effectively and the desire to pass on their knowledge to others. A good working knowledge of OS, JCL and Utilities is also required.

For further information or application forms please contact:

Alan O'Connor  
LOLA  
Tower Point North  
Sydney Road  
Enfield EN2 8UE  
Tel: 01-366 6611 Ext. 280.

Closing date for receipt of completed applications 31 August.

**LOLA**

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Experience of COBOL on ICL 1900 or 2903/4/5 disc-based systems plus supervisory or production systems experience can lead to an attractive remuneration package giving up to £7,000 per annum.

The Company has an impressive group record based on seven manufacturing units.

Plans are in hand for an extensive hardware upgrade involving the installation of an ICL 2905 with communication links. This presents an opportunity for suitable candidates to share in the successful development of the Data Processing activity.

We offer a starting salary which will attract the most able and experienced applicants. Our range of Company benefits include a contributory pension scheme, life insurance, discounts on company products, assistance with relocation expenses and a profit-sharing scheme paid twice yearly.

Places write to:

Mike Staines, Personnel Manager  
Schreiber Furniture Ltd.  
Edinburgh Way  
Harlow, Essex

## LANCHESTER POLYTECHNIC AT COVENTRY FACULTY OF APPLIED SCIENCES Department of Statistics and Operational Research RESEARCH ASSISTANT

(TENABLE FOR 1 YEAR)

will require the person appointed to assist with research in one or more of the following areas: Statistical Computing, Demography, Medical Statistics, Physical Distribution.

A newly-qualified graduate or research student, to be given the opportunity to gain experience of the Polytechnic sector of Higher Education.

## Compeda

Computer Systems for Technology

## APPLICATIONS SUPPORT ENGINEER INDUSTRIAL ENGINEERING SOFTWARE c. £8,000

Compeda needs an individual, male or female, to join a team implementing new versions of our industrial engineering packages - AUTOMAT, NULISP and COMPUTE. There will be liaison with customers to solve particular problems and involvement in consultancy and training. The basic qualifications include a technical degree and good FORTRAN experience. A relevant industrial background would be an advantage.

This post is based at our Headquarters in Stevenage. A bonus scheme is in operation and removal assistance is also available.

## TECHNICAL SALES CONSULTANT CAD SYSTEMS FOR ELECTRONICS c. £9,000 plus Company Car

Compeda needs additional men or women to join the team successfully selling and supporting our GAELIC system for analysis and design of VLSI. The system is already in use in Europe and the USA, as well as in the UK, and the new consultant will be responsible for customer liaison in the UK with some involvement in Europe. The post is based at our Headquarters in Stevenage. A car will be provided and the remuneration package includes a results-related bonus scheme. Removal assistance is also available.

## OPERATING SYSTEM CONSULTANT/ COMPUTER MANAGER c. £9,000 subject to experience plus Company Car

Compeda now seeks an individual, male or female, to fill a new post concerned with the implementation of high technology computer aided design systems on various computers. Most of our systems are written in transportable FORTRAN. Our requirement is to create implementations for a range of mainframe (IBM, CDC, UNIVAC) and mini (VAX, PRIME) computers. Other tasks will involve software security and standardisation. The post is based at our Headquarters in Stevenage and includes responsibility for our in-house prime 400 system. A car will be provided and the remuneration package includes a results-related bonus scheme. Removal assistance is also available.

Compeda specialises in the production of software systems for use by engineers for the solution of design problems in a wide range of industries. Our software is based on Research and Development from British Universities and Research Establishments. Our range of products, already used in industry, include GAELIC for integrated circuit layout and analysis, and the Plant Design Management System (PDMS) for chemical plant modelling and design. Both of these systems are world leaders in the relevant application areas. Compeda is financed by the National Research Development Corporation and is the leading British company involved in the international exploitation of computer aided design software. The headquarters of the company are at Stevenage and subsidiary offices exist in New Jersey, California, Germany and Holland.

Write with career details to  
K.G. Trickett  
Compeda Limited  
Compada House  
Walkern Road  
Stevenage  
Hertfordshire SG1 3QP

## MYRIAD

## SENIOR ANALYST/ PROGRAMMERS

2960 INSTALLATION C. £7500  
S.W. LONDON

A major group of Companies whose Head Office is situated in S.W. London, easily accessible by all forms of transport, have completed installation of a dual ICL 2960 configuration and are now progressing to the next phase of development.

A comprehensive plan of Systems and Programming activities has been established with board level approval and four major systems are scheduled for implementation by the end of 1980.

### SENIOR ANALYST/PROGRAMMERS

Joining a technically stimulating and progressive department candidates will receive formal training in key areas of large 2900 development. Having attained senior programming levels candidates should have good COBOL experience and be familiar with 1900 software. An interest in commercial and financial systems would be ideal and whilst gaining advanced technical expertise the persons appointed will be encouraged to develop their skills in analysis.

All positions have an attractive benefit package including Flextime, four weeks holiday, and Pension Scheme.

Ref. E1/0908

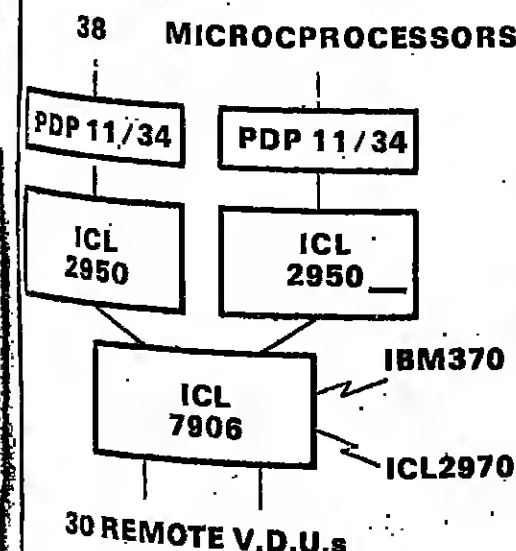
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OTHER MAIN FRAMES

If you are ambitious, have some experience in the fields mentioned and want to join a team of professionals developing new and interesting projects, contact Mike Shore or Mike Viney on Littlewick Green 2166 or write for an application form to Mrs. Pam Polak at Southern Electricity House, Littlewick Green, Maidenhead, Berks. SL6 3QB, quoting 58/79, by not later than August 29th, 1979.

## Systems Programmers-Paris

Our client, a major American company, producing industrial chemical products, has recently ordered an IBM 3031 to replace the existing 370/135. An opening exists for a CICS Systems Programmer to join the high-calibre development team based at their computer centre near Paris. This team is utilising the most advanced techniques to rationalise the company's existing European network. Applicants must offer an in-depth knowledge of Assembler, Cobol and PL/I, and have been involved in the generation/implementation of new CICS

releases as well as tuning and monitoring the performance of the existing software. The successful candidate must be prepared to participate in the evaluation of new software from IBM and the independents and to assess its relevance to the installations requirements. This is a rare opportunity to further your career and develop State-of-the-Art DP technology in a permanent position in France, whilst benefiting from the resources of a truly international company. A working knowledge of the French language is essential.

£10-16K

## Consultant

A consultant is required by this small, rapidly expanding Central London Group. At least 5 years DP experience is required, particularly in the areas of database and/or communications on mini computers, plus an ability to liaise with customers. £7-9K + Profit Sharing

## Message Switching

Do you value working at the forefront of technology in the message switching field? If so, our clients, who are market leaders in their field, have authorised Matrix to initiate serious negotiations with a view to offering you a superlative career opportunity. Several positions have arisen within development teams based throughout S.E. England and the EEC. Matrix has been instructed to shortlist suitable candidates for the following posts: **Project and Team Leaders, Systems Designers, Analysts and Programmers**, both senior and junior. The hardware background is not particularly relevant but experience at the programming level calls for either Assembler, COBOL, RPL or BASIC. Relocation expenses will be met where applicable, and big company benefits are offered in keeping with our clients' prestigious reputation.

## Fortran £7 K

A leading Bureau with international connections is seeking Fortran programmers with at least 2 years experience to work in their Surrey offices. Knowledge of finite analysis, modelling and forecasting applications would be an advantage.

## Germany

Communications Consultant required to implement low level protocols such as X25, HDLC. Experience of high level protocols, e.g. virtual terminals, and file-to-file transfer desirable. £15-18K

UK-to £9.5K  
EEC-to £15K

## Radar DP-Europe

Senior Systems Designers and Senior Real Time Programmers are required for a number of advanced air defence system projects being undertaken by the Dutch, Belgian and German offices of a large and prestigious British Systems and Software Group. Particular machine or language background is less important than a thorough grounding in real-time system principles plus real-time implementation experience. Radar data processing systems experience of special interest, particularly at the system design level. Our Client also offers a wide variety of long term opportunities as Consultants, Software Specialists and Managers in an expanding, international group of companies with a reputation for project reliability and quality control. Relocation expenses will be paid. Benefits include life and health insurance and optional company pension scheme.

£12-18K

## Financial

Our client, a rapidly expanding Software House, Service Bureau and Consultancy is urgently seeking Customer Account Supervisors for their Croydon and City offices. Work will include Data Control, Package Installation and Quality Control. There will be a considerable amount of customer liaison and participation in the Sales effort of the company is expected. A minimum of 2 years programming in a commercial environment, preferably a combination of minis and mainframes, is essential. A general financial background including knowledge of accounting or banking will be very welcome. Initiative, flexibility and a willingness to work hard will be well rewarded both in terms of salary and job satisfaction. This company offers great scope for learning new skills and unvalued opportunities for promotion. Benefits include profit sharing, non-contributory pension, life assurance and BUPA schemes. LV's share purchase scheme and relocation expenses where applicable.

£6-8.5K + Bonus

## PL/I

PL/I Programmers and Project Leaders are required by an international company for Central London, Herts and Hants. IBM hardware and DB experience advantageous. Programmers £5-7K, Project Leaders £6.5-8.7K

## W. London-V.R.C.

This manufacturer is seeking Assembler and COBOL Programmers with a minimum of 9 months experience. Applications include invoicing, inventory control, management information etc. Excellent career prospects. £4.9-6.7K

## Oxford £6-9K

Our client requires Operating Systems Designers and Compiler Writers, having at least 2 years in software development, to join their research team near Oxford. Opportunities for overseas travel frequently arise.



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For further information please contact:

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(24-hr. service)

Licence No. SE(A)3081

## OPERATIONS MANAGEMENT YOUR FIRST OPPORTUNITY MINI COMPUTER FELTHAM, MIDDLESEX.

A mini computer is being installed in our client's modern offices in Feltham to handle the increasing volume of business.

A Computer Operations Manager is required to be responsible for the supervision of staff, the scheduling of work and the general day to day running of the installation.

This is an ideal opportunity for a career minded person, with a data processing background, to move into operations management. Prospects are excellent and the company offers future involvement in all aspects of computing. Salary will be negotiable around £5,500 and company benefits include 4 weeks annual holiday and a subsidised staff restaurant.

If you are currently employed in operations, data control or a similar environment and feel that you are now ready to run your own operations department, contact PATSY BARNES at the Croydon office for further information.

Positions open to male & female applicants, please telephone 01-686 9693 for initial discussion or apply to address below. QUOTE REF. CW 1598P

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London, W.1

c. £7,000

A UNIQUE OPPORTUNITY HAS ARISEN WITH OUR CLIENT, ACC MANAGEMENT SERVICES LIMITED, PART OF THE ACC GROUP — TELEVISION, FILMS, RECORDS AND MUSIC.

Reporting to the Director of Group Data Processing and Consultancy Services you will liaise with other companies in the Group, working on:

1. Designing and developing accounting based computer systems.
2. Developing and using a consolidation package on in-house terminals.
3. Co-ordinating use of a general ledger package for two companies in the Group.
4. Advising and assisting other companies in the Group in implementing and using accounting packages.

If necessary, formal training in systems analysis and financial modelling will be provided.

Candidates for this post should have:

1. A numerate or business studies degree.
2. A knowledge of accounting systems.
3. An interest in internal consultancy.
4. Experience of working with computers and computer terminals.

For an initial discussion in complete confidence, please telephone us on extension 67, or write in confidence quoting Ref. 101.

INBUCON MANAGEMENT CONSULTANTS LIMITED  
COMPUTER PERSONNEL  
187 KNIGHTSBRIDGE, LONDON, SW7  
TEL: 01-584 6171

Royal Greenwich Observatory  
La Palma Computers Group

## PROGRAMMER

A vacancy has arisen in the La Palma Computers Group for a programmer to work on the computer control of a 1.0-metre telescope, one of the telescopes which is to be sited at the new observatory on La Palma in the Canary Islands. The person appointed will be expected to work with the 2.5-metre telescope programmer on common software and to develop and commission a complete system for the control of the 1.0-metre telescope.

The successful applicant will work initially for a period of two to three years at the Royal Greenwich Observatory, Herstmonceux and then will be expected to undertake tours of duty on La Palma commissioning software and providing assistance in the early stages of its use.

This post, which will be graded Higher Scientific Officer or Scientific Officer depending on the qualifications and experience of the successful applicant, will be particularly suitable for a Physics or Computer Sciences Graduate who has a First or Upper Second Class Honours Degree and who would like to spend some time abroad. Applicants with a good Maths or similar degree will also be considered.

Salary scale:  
HSO current £4727-£8211; 1.1.80 £5097-£8737  
SO current £3289-£5085; 1.1.80 £3591-£5488  
Starting salaries above the minimum of both scales for candidates with suitable experience and qualifications.

There is a contributory pension scheme.

Application forms and further details from Mr. N. Jones, Royal Greenwich Observatory, Herstmonceux, Hailsham, East Sussex, BN27 1RP.  
Closing date: September 7, 1979.

## datascene

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SYSTEMS &  
PROGRAMMING  
c. £9,000

In a varied and fulfilling role, you will work closely with both clients and consultancy staff on all aspects of recruitment: from job identification, through to advertising, interviewing, selection and the presentation of short lists.

You should be 25+, professional in approach, and already have a proven track record of success in the DP field, which should include experience within Systems & Programming. This, coupled with sales motivation, business sense and the capacity for hard work, should reap more than ample rewards.

For more information please call  
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## COBOL PROGRAMMER

\*\*\* EXPERIENCE — 2-3 years

\*\*\* SALARY — to £6,000

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**ata**

## Anglian Water Authority ELECTRONIC INSTRUMENT TECHNICIAN

(Computer Analogue)  
Post No: R3R29 Grade 4 £3,887-£4,184  
(plus £312 p.w. supplement)

Applications are invited from suitable, qualified and experienced persons for the above post based at Boston within the groundwater unit of the Resource Planning Section of the Civil Engineering Department. Applicants are expected to have a degree or HNC or equivalent in computer science and electronics and several years' relevant experience. Applicants should be able to collate and analyse hydrological data and the ability to design, construct and maintain simple electronic component and circuit design. The duties of the post include working in a small team under a hydrologist in connection with the programming, operation, routine maintenance and improvement of electronic analogue and computer equipment, simulating and modelling groundwater resources systems, including the collection, analysis and programming of relevant data and the preparation of reports and experimental results. Groundwater forms an important contributor to the Division's Water Resources and a wide programme of investigations and surveys is in hand and will continue in future years. The post provides an opportunity to broaden and widen experience in analogue and digital modelling, and to gain specialist knowledge in connection with groundwater modelling. RJC for Water Service Staffs conditions of service apply, and a location allowance is payable in appropriate cases. The post carries a capital users allowance, and a present review of salaries is being negotiated.

Application forms, which are returnable by 10th September 1979 are available from the Divisional Manager at the address below.

LINGOLN SHIRE RIVER DIVISION  
66 Wide Regatta, Barton, Lincolnshire PE22 9BA

## We've made things easy for you!

If you're chasing a new job or a new contract, save time by filling in your application form here and now.

**Personal** Please write in ballpoint, using block capitals.

Surname \_\_\_\_\_ Forenames \_\_\_\_\_  
Address \_\_\_\_\_

Tel. Home \_\_\_\_\_ Office (discretion will be used) \_\_\_\_\_  
Age \_\_\_\_\_ Place of Birth \_\_\_\_\_ Car? \_\_\_\_\_

Are you prepared to relocate? \_\_\_\_\_ UK/Abroad (delete) \_\_\_\_\_

**Experience** Place no. of yrs. in box, e.g. IBM 360/370 **4**

**Machines:** Please specify model. **Applications**

IBM 360/370 ☐ Commercial ☐  
IBM others (specify) ☐ Financial ☐  
ICL 1900/2900 ☐ Payroll ☐  
ICL others (specify) ☐ Production control ☐  
Honeywell ☐ Stock control ☐  
Univac ☐ Scientific ☐  
Burroughs ☐ Realtime ☐  
PDP ☐ Software ☐  
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☐ Message switching ☐  
☐ Communications ☐  
Other mini-computers (specify) ☐ Data transmission ☐  
☐ Central process ☐  
☐ Teleprocessing ☐  
☐ MIS/ACPA/PERT ☐  
☐ Magnetic tape ☐  
☐ Disk ☐  
☐ Others (specify) ☐

**Languages**

Cobol ☐  
Plan ☐  
Assembler ☐  
PL/I ☐  
Fortran ☐  
Filetab ☐  
RPG II ☐  
Auto/Teasy/USER code\* ☐  
Others (specify) ☐

**Job Titles**

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Systems analyst ☐  
Systems engineer ☐  
Analyst/programmer ☐  
Systems programmer ☐  
Programmer ☐  
Operations supervisor ☐  
Operator ☐  
Consultant ☐  
Sales representative ☐  
Others (specify) ☐

**Position sought** Please state briefly the type of appointment you are seeking.

Minimum salary £ \_\_\_\_\_ Notice required/Date available \_\_\_\_\_

Signed \_\_\_\_\_ Date \_\_\_\_\_

Cut out the whole advertisement and post to the address below.

**Knight**

**Knight Computer Services Limited**

Staff Services Division of BOC Overseas Group and a member of Computing Services Association  
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For an immediate interview please telephone the London office, quoting reference number DVW/U1.

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## BUSINESS ANALYSTS

### Wiltshire & London

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While other organisations think about setting up the electronic office our client has already started to create it. It features IBM 4300, communicating word processors and IBM 3/50 hardware and uses advanced software.

COULD YOU BRING THE HUMAN TOUCH TO THE ELECTRONIC OFFICE? Further business analysts are now needed to sustain the high pace of development within the organisation.

We are looking for a particular type of person rather than a particular type of experience but certain qualities are essential.

Positions open to male & female applicants, please telephone (24 hour service) for initial discussion or write to address below. QUOTE REF. CW164-9H

Candidates must understand the implications of convergence, (not necessarily the deep technicalities,) of word processing, telecommunications and data processing. Must have the self motivation to work on their own initiative or as a member of a small potent team; must be able to agree plans with director level users and to be able to deliver results on time and within budget; must be able to show a record of achievement in business systems.

Our client is an insurance broker, part of a major financial group. A knowledge of insurance or financial systems would therefore be valuable although not essential.

Whether you enjoy living in Town or in the country a suitable location is available for you. If you have to move, your relocation expenses will be paid. Starting salary will be competitive and attractive benefits apply. Telephone Capp Associates to find out more.

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OUR REPUTATION TELLS ALL

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Singer 1500 or System 10 Progs. £250 to £500 p.w.  
U.K. Europe or Canada Honeywell Level 66 IDS/TDS Progs. £250+ p.w. London.  
Univac 1100 Cobol £235+ p.w., in Wilts.  
I.C.L. 20900 Cobol £235 p.w. All areas.  
I.B.M. Cobol/Assembler Progs. £245+ p.w. Essex.  
Corel any machine Progs. £250 p.w. Midlands.  
I.C.L. George II or George III. Tech. Support £225 p.w. Midlands and Wales.  
I.C.L. 20900 VME/B Support £250 p.w. Yorks.  
I.B.M. Cobol Progs. with IMS £450 p.w. Germany.  
I.C.L. VME/K Systems Support £450 p.w. Germany.  
Plan of Cobol Progs. £400 p.w. Germany.  
Any Computer Person with fluency in any European languages/Top Pay.  
More contracts are imminent. Permanent positions with **TASK FORCE** will be considered for all requirements listed.

### PERMANENT POSITIONS FOR OUR CLIENTS

Senior Analyst for manufacturing company. N.W. London. Circa £7½k. Plus all company benefits and relocation package.  
I.C.L. 20900 George II + support. South Wales, to £8½k.  
Scientific/Realtime Progs. In Surrey with Mini-machine experience.  
£5½k to £7k plus all usual benefits.  
Cobol/Assembler Progs., 2 years+ experience South-East Essex.  
£5k to £6k + Mortgage.  
I.C.L. 20900 Cobol Progs., 2 years+ experience London City, £5k to £6½k + 3½% Mortgage.  
Honeywell level 64/68 Cobol. London and North West. Top salaries.

## MYRIAD

### OPERATORS - NO NIGHTS

N.W. LONDON

c. £5500

One of the most successful retailing organisations in the U.K. has recently installed sophisticated mainframe equipment and is currently seeking to recruit additional operators.

A variety of interesting applications are processed incorporating a mini-based communications network presenting a technically stimulating environment with plenty of job interest.

Candidates should have at least eighteen months' operating experience, preferably in an IBM System 3 environment and be capable of demonstrating both initiative and a sense of responsibility since they will be required to work with a minimum of supervision.

To the enthusiastic person, there is the opportunity to accept additional responsibility of running a shift and total involvement in an installation utilising modern equipment and operating techniques.

Apart from a realistic commencing salary, the company also offer attractive benefits normally associated with major organisations. Ref. N2/1608

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Due to increasing activities in the turnkey field, an established computer services company and subsidiary of an international group wishes to recruit an additional project team.

- 2 Project Leaders
- 2 Senior Programmer/Analysts
- 1 Leading Programmer

Applications are invited from programmers with two-six years' experience. Preference will be given to candidates with mini-computer experience (IBM 32/34 or DEC PDP 11) but this is by no means essential as full training will be given.

The company offers excellent working conditions and benefits which include four/five weeks' holiday, free or subsidised meals, non-contributory pension scheme, free life assurance, and preferential mortgage scheme.

Ref: CW 32/1.

Please contact:

**CHRIS TILBROOK**  
TYLIN PEOPLE

A division of Tylin Management Systems Ltd.  
Leon House, High Street, Croydon  
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Services  
Association

We have created an excellent opportunity for an individual who is wishing to make the transition from Operations into Systems Programming.

Our ideal applicant will have gained 2/3 years operations experience during which time he/she will have had considerable exposure to OS JCL and IBM utilities.

If you are able to demonstrate knowledge of a high or low level programming language, it would be considered a distinct advantage.

Initially, you will be expected to become involved in the conversion of our twin IBM 370/158 installation from OS/SVS to MVS, providing a support facility to our users and effecting a successful changeover.

We are prepared to offer whatever training is necessary to ensure your future career progression provided that you are able to convince us of your potential and ability to work with the minimum of supervision.

Since we are a large International Organisation, you can expect to receive all associated benefits including the prospect of overseas travel.

If you are ready to take this important step in your career, contact our Advising Consultant, **ANDREW CARTER** ON: 021-236 3781 (24 hour answering service).



### Specialist Computer Recruitment Ltd

London 01-935 0871 3 Mandeville Place, Wigmore Street, London W1M 5LB  
Birmingham 021-236 3781 35-37 Great Charles Street, Queensway, Birmingham B3 3JY  
Manchester 061-833 0427 Blackfriars House, The Parsonage, Manchester M3 2JA

021-236 3781



**JBA****Technical Consultants****Germany/Europe**

An established Swiss-based software house with operations in Switzerland, Germany and Holland require senior personnel as Consultants. Applicants should have professional qualifications and at least five years' experience in their field. Particularly of interest are individuals with in-depth knowledge of one or more of the following:

MVS, CICS, VTAM, ITAM, TCAM, RTAM, NCP, SNA, IMS, etc.  
Computer implementation, operating system design, multi-processor development, high-reliability systems design, TP networks, Database design etc.  
Excellent salaries and relocation assistance given.  
Contact: Andy Wright & Mike Creamer

**Micro S/W Quality Assurance****Swindon**

Our client is a uniquely successful small company, which has developed a series of "leading-edge" software products for interactive micro-processor programs and applications development. The expansion of their product range over the past six months has largely been, and will continue to be, a succession of self-generating logical steps into the wider sphere of operating systems per se, as well as development tools.  
This growth has led to a requirement for "Quality Assurance" type of role, in which a software-orientated individual would not only set development software but also maintain the company's ANSI standards etc. Candidates must, therefore, have a software-orientated background and be fully conversant with IBM COBOL and its uses.  
An important and vital position, with a substantial salary to match.  
Relocation assistance is negotiable available.  
Contact: Andy Wright

**Instructors****Herts.**

A number of vacancies have been created within the Education Division of one of the UK's major computer manufacturers. Courses given, cover an extremely wide range of technical and other skills for engineering, systems, programming and customer/clients staff. Applicants must therefore possess sound all-round computer experience which should include management presentations and user training.  
Excellent career prospects for the ambitious individual.  
Contact: Margaret Stevens

For further information on any of the above vacancies, please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

**JAMES BAKER ASSOCIATES, International Personnel Consultants,**  
32 Savile Row, London W.1. Tel: 01-439 9311.

**Business Analyst (Minis)****Herkshire**

This outstanding opportunity for a successful Analyst/Programmer to move on to pure Business Analysis. You will be given the chance to design and implement new and extremely complex material handling systems, around a worldwide network of minis. This will involve a lot of overseas travel to the U.S.A. and Far East to a limited extent. In NUT plant-hopping or extended stays abroad. To help implementation at each site.  
Whatever your hardware background, if you understand the concepts behind networks of minis and have a sound accounting systems knowledge, this represents a real career building move.  
Company benefits include an excellent pension scheme plus medical (like BUPA/PPP) insurance and free life assurance schemes. Generous relocation assistance is also available if required. Additionally, the initial starting salary will be reviewed within 6 months.  
Contact: Andy Wright

**Database Programmer****City**

A large Shipping company requires a highly technical applications programmer/systems programmer to work with their data administrator. The successful applicant will be involved in technical control of their database (IDMS) and data dictionary and will have to liaise between departments. The company is looking for a programmer with up to three years' experience of IBM ASSEMBLER and ideally PL/I. Knowledge of a database and TP would be an advantage but training will be given in PL/I, IDMS and data Dictionary techniques.  
Salary according to experience. This is an excellent opportunity to work on new technology projects.  
Contact: Margaret Stevens

**Real-Time Programmer****South West London**

JBA has been retained to recruit an experienced Programmer for a specific project, which is an advanced time-critical micro-based satellite navigation system. Candidates, ideally graduates, must have a predominantly software-orientated background, with experience of high level languages, FORTRAN, FORTRAN or ALGOL, and of particular interest. Experience of hardware development is not required although would be obviously extremely valuable. The company is a well established and progressive organisation with a deserved reputation as a world leader in the design and manufacture of communications systems. Some relocation assistance offered.  
Contact: Margaret Stevens

## SYSTEMS ANALYST

London £5,300-£6,600

ELLERMAN LINES LTD need an experienced Systems Analyst to join a team which is developing a variety of applications in Shipping, Browning, Insurance and Travel. Systems will be based upon the group's new Twin ICL2904 computers which will provide on-line services to various offices throughout the UK. The appointment is based in the City, but some travelling will be necessary.

**SALARY:** In range £5,300-£6,600 depending on experience and with opportunities to advance.

**REQUIREMENT:** Min. 12 months systems analysis, including experience of accounting systems.

Phone or write to Dave Hemmond,  
Ellerman Lines Ltd.,  
12-20 Canonic Street,  
London EC3A 7EX.  
(Telephone 01-283 4311)

## Systems Analyst/Programmers

£4,500-£5,750 Edinburgh

The Institute of Occupational Medicine is the coal industry's research centre for medical and allied problems. We seek experienced analyst/programmers for the development of research-related computer projects. Languages used are Cobol, Fortran and Assembler. Access to an IBM 370/158/3933 system is via a multi-function terminal system with interactive and batch facilities.

Salary, dependent on experience and ability, will be in the range £4,500 - £5,750 and is supported by excellent conditions of employment.

The appointment is for a period of three years.  
Please apply, in writing, to

**NCB**

The Area Staff Manager/Secretary,  
National Coal Board, Green Park,  
Greenend, Edinburgh EH11 7FZ.

### THE UNIVERSITY OF LEEDS

DEPARTMENT OF APPLIED MATHEMATICAL STUDIES

Apply directly to the post of

### COMPUTER OFFICER

In Applied Mathematics. The duties of the Computer Officer will include: (i) provision of assistance in computing to undergraduates and postgraduates; (ii) maintenance and repair of the computer; (iii) the conduct of an independent line of research. Candidates should possess a first class honours degree in Applied Mathematics, or a similar degree, with a minimum of 2 years' experience of engineering or scientific computing. The appointment will be made for a fixed period of three years.

Salary is an important part of the offer. Salary will be determined according to the University's grading system. Further information on this post can be obtained from the Head of Department, Professor D. G. Coughlin (0532 31761, ext 7304).

### LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE

(University of London)

### KEPPEL STREET, WC1E 7HT

### DEPARTMENT OF HUMAN NUTRITION

### COMPUTING ASSISTANT

A Pre-School Child Growth Survey requires a computing assistant, to work as a member of a small team up to 30 September 1981 on the handling of data from a large longitudinal survey, with responsibility for data checking and for maintaining data files in preparation for analysis.

Applicants should be qualified in computing to HND level or equivalent, and have had experience in data processing.

The University of London Computer Centre CDC 8600 system is used.

Good salary will be in the range £3,500-£4,000 (plus benefits) depending on age and experience.

Applications, consisting of full education and career details and naming two referees, should be sent to Secretary JA11 at the School.

## STAR JOB SPOT

### DATA CONTROL SUPERVISOR/SENIOR CONTROLLER

To £7,000  
A major London Council requires a Data Control Supervisor and Senior Data Controller, both positions requiring high level JCL, supervisory and database management experience. These senior positions must involve application of a high standard. If you have the right background, ring now for more details.  
CW 33/1 TRICIA

### OPERATOR

To £4,800  
If you have 9 months' DEC PDP 11 experience, then here is an opportunity to join a banking institution and enjoy the excellent benefits offered. This includes mortgage assistance, Non-CPS and a bonus scheme. Don't delay - ring now.  
CW 33/2 TRICIA

### OPERATORS TO SHIFT LEADERS

£3,800 to £5,800 NR. HAVI 8, MIDOX.  
Join one of the most advanced computer installations in the country. The latest IBM 3000 equipment plus ICL 1900 series. This ranges commercial business units from BUPA, CPS, and many other attractive firms.  
CW 33/3 TRICIA

### FREELANCE PROGRAMMERS WANTED

U.K. TO £300 p.w.  
ICL 1900 2900 VMEB  
ICL 2903 MTS2  
ICL 2900 SCL  
IBM PL1 CICS

OVERSEAS TO £450 p.w.  
IBM ASS/PL1  
IBM ASS/FORTRAN/PLAN  
IBM COBOL OS  
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1YR. +

Recruitment Consultants  
**UNIVERSAL COMPUTER ASSOCIATES LIMITED**  
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## VICTORIA APPOINTMENTS LIMITED

## MANCHESTER TECHNICAL SUPPORT MANAGER

Salary c. £7500

Our Client, a Manufacturing Group in the automotive components industry is currently involved in the development of new DB/DC systems to support their production control functions to integrate with existing commercial systems.

This development is on IBM 370/13B under DOS/VS with CICS and DL/1 and a new IBM 4341 is currently on order.

The Technical Support Manager is now required to take on the responsibility for all aspects of hardware and environmental software development, together with the Management of Computer Operations, being directly responsible to the Computer Systems Manager.

The successful candidate will have experience in controlling an Operations Department in an IBM installation with at least 3 years' experience of Systems Programming.

If you are a Graduate with approximately 5 years' computer experience and fit the above requirements, we would like to hear from you.

Relocation expenses will be met where appropriate.  
Ref: 09879

For an application form in respect of this and many other vacancies contact:

Victoria Appointments Limited, 24 Mosley Street, Manchester M2 2JF  
Telephone 061-236 7319 (24-hour answering service) and 061-236 7417 (Home) 061-440 8134.

## Contract

### Programmers-Analysts

If you are thinking of doing contract work why not start here by registering now for immediate and forthcoming requirements.

For further details contact:  
Bridget Kotchie  
RENDECK LTD. 100 New Bond St.  
London W1. Tel: 01-629 5438

**Rendek**  
Recruitment Consultants

## LOWER LONDON EDUCATION AUTHORITY

## Computer Programmer

Research & Statistics Division

Salary Range: £5655.64-£8114.64 (inclusive)

A programmer is required for team of 6 providing support to the Division and branches of ILEA.

Computer programming is in Fortran using the CRJE and CDC tape-processing networks on the OLC's IBM 370 computers. Applicants should be experienced Fortran programmers with, ideally, a degree or professional qualification and a knowledge of statistics.

Salary and application forms obtainable from the Education Officer (EO/Enlab. 1B) Room 387, The City Hall, London SE1 7PB (please enclose a stamped addressed envelope).

Forms to be returned not later than 4 September 1979.

## LIVERPOOL POLYTECHNIC

Department of Computer Services

### POST A APPLICATIONS MANAGER

### POST B SYSTEMS MANAGER

£7680-£9639 + £72 p.a.

Applications are invited for the above posts which are new positions within the recently-created Computer Services Department.

Plans for an extensive enhancement to the existing facilities are at the earliest stages. Staff levels are under review and a considerable strengthening of the programming staff, which is currently at a minimal level, is expected.

This is a rare opportunity for the successful candidate to help shape and develop the services the department will be able to offer to the Polytechnic in the future.

Experience with interactive facilities in an educational environment is essential.

PLEASE QUOTE REFERENCE LP/342 (POST A OR B). Closing date is 14 days from the appearance of this advertisement.

Application forms and further particulars from the Personnel Office, Liverpool Polytechnic, Richmond House, 1 Rumbold Place, Liverpool, L3RH. Tel: 051-227 5581, Ext. 43.

## SWITCH TO MICHELIN

TAKE A GREAT TREAD FORWARD

### OPERATIONS AND DATA PREP SUPERVISOR

MANAGEMENT SERVICES, DEPT., LONDON, E.W.3

Michelin, the world's leading radial tyre manufacturer, wish to recruit an Operations-Data Preparation Supervisor for its Computer Information Systems Department.

The work involves planning and scheduling operations and data preparation; staff work loads; preparation of operational instructions; job assembly and control; maintenance and up-date of tape and disk files; training of data preparation clerks/Computer Operators.

Sound training in computer, operations/data preparation by a recognised method is essential.

Age range: 21-30 years of age, with a minimum of 2/3 years' experience of operating an IBM main frame or mini computer. Michelin offers an individually negotiated salary to attract the calibre of Supervisor required. The position is full-time with statutory holidays; has life assurance and contributory pension scheme.

After an interview, successful candidates will be offered a 3-month probationary period, together with attractive financial packages. Please write in confidence, giving details of age, experience, qualifications and current salary. Enclose a stamped addressed envelope. The Personnel Manager, Michelin (UK) Ltd., 27 Fulham Road, London SW3 6LH. Tel: 01-874 0100. Applications should be sent to this address.

## CAREER PROGRESSION IN PROGRAMMING

**COBOL PROGRAMMERS** £6,500  
West London / Middx. December review

\* Free 4-course luncheon  
\* Free car parking

18 months' commercial experience (machine unimportant)

Training will be given in IBM Assembler and CICS/DLI. A committed programme of development will commence early next year for the delivery of an IBM 4341 with fully integrated DB/DC facilities.

Career prospects are excellent within this very prestigious organisation.

**SENIOR PROGRAMMERS** £6,900  
Central London

\* Cheap mortgages  
\* Annual bonus  
\* Flexitime

We are particularly interested in hearing from you if you have 2 years' Cobol programming 1900 GEORGE III or 2900 VMEB desirable, but not essential for this expanding D.P. Department.

Phone Bobbie McCormick for more information on 01-603 7335 or 01-603 5215

**Information Processing People**

80 Penton Road, London W8. Tel: 01-252 0000  
Computer Services & Recruitment Consultants 01-603 7335

01-603 7335



## FIELD ENGINEERS

System Industries is a Californian Corporation active in the minicomputer peripheral business, with offices in Woking, U.K., Germany and Scandinavia.

Over the next few months we will be expanding our Customer Engineering Department, and will be recruiting Field Engineers at all levels to work on our advanced micro-processor based disc controllers. We are particularly looking for engineers with minicomputer system experience.

Salaries range from £5,000 p.a. to £9,000 p.a. with generous benefits including Private Medical Insurance, Life Assurance and company car.

For more information please ring Prue Birkinshaw on Woking 5077, or write to:



System Industries (Europe)

System Industries (Europe), System House, Guildford Road, Woking, Surrey GU22 7QQ

## CHELSEA COLLEGE, University of London COMPUTING CENTRE

An experienced

## SYSTEMS PROGRAMMER

is required to take charge of a small group responsible for special operation systems and related software development and maintenance. The Systems Group is within the Computing Centre, which is a part of the University of London. The College is a leading centre for research in the field of computer science and related disciplines.

The Centre is building up a Harris S125 (24 user) computer system installed last November, running under the VULCAN operating system. To replace the Elliott 4130 mainframe computer which the Group are expected to continue supporting until late 1980. The Elliott has a PDP11/40 front-end for interactive multi-access, running under DOS V.9 and which also supports RJE to CDC mainframes at the University Centre.

The person appointed will be expected to have a strong systems background, including hardware, and preferably operations experience. Salary will be on the Grade II scale for universities (provisional staff, £7388-£8954 now, and £7729-£9494 as of 1st October 1979 (inclusive of £502 London Allowance)).

Further details, including an application form, may be obtained from the Personnel Office, Chelsea College, Fiese Green House, Chelsea Manor Street, London SW3 3TW. Closing date: 5th September, 1979.

## Borough Engineer & Surveyor's Department Technical Assistant

(Projects)  
£3906 - £5388

A Technical Assistant (male or female) is required to assist the Project Engineer to prepare management information regarding project scheduling, resource planning, etc., using analytical techniques and to assist and advise Engineers and other officers in aspects of data processing, etc. Maintenance of the Management Information System involves using the Council's computer to produce regular comprehensive information on all schemes in the Department's Programme of works.

Training may be given to a suitable applicant, although a candidate conversant with data processing work (e.g. an ability to use a desk-top calculator unit or a paper tape punch machine for computer data preparation/work assembly) would have a distinct advantage.

Further information and application form available from the Borough Engineer, Town Hall, High Road, ILFORD, Essex, to be returned by 31st August, 1979.

**Redbridge**  
London Borough

## Outstanding Compelling Opportunities

The Council will shortly be installing an ICL 2960 and will be developing on-line financial and property database systems. We can therefore offer exciting prospects of extended technical knowledge and provide ideal opportunities for the right people to get on the ground floor.

## Systems Programmer

Who will be responsible for the development of communications using 7502 controllers, and also operating systems and software.

## Systems Analyst

To play an active part in the design, development and implementation of a database.

Applicants for both posts should have a knowledge of COBOL, plus the Systems Programmer will need to have a good knowledge of PLAN.

Both posts offer:-

- \* Salaries up to £8756 p.a. inc.
- \* Housing accommodation or legal fees to 14th for house purchase
- \* 100% removal expenses.

Further details available from the Personnel Officer, The Council Offices, The Campus, Welwyn Garden City, Herts - Welwyn Garden City, Ext. 203. Closing date: August 31, 1979.

**WELWYN HATFIELD  
DISTRICT COUNCIL**

## B.T.D.B. Computer Services Experienced Systems & Programming Staff

### Middlesex

British Transport Docks Board, which is a profitable and commercial port management organisation, has an established central computer services department. An ICL 2960 with DME/ANIE/IB and MAC/online development capabilities is to be installed at the Board's Computer Centre this autumn to replace their existing System 360 computer. Reliable minicomputers with communications facilities have already been installed at the Computer Centre and at a number of the ports as part of the planned communications network.

### Systems Analyst

£6094 - £6864

Will need to have adequate systems and/or programming experience and the correct personality to deal with users at all levels. Responsibilities include design, development and implementation of a variety of applications, and considerable interaction with users at all stages of development and thereafter to maintain system integrity.

### Senior Programmer

£6094 - £6864

Will need to have substantial programming experience and a genuine interest in both staff and applications development. Responsibilities include computer suite/file design and the supervision of programming staff within the project team.

### Programmers

£5390 - £5874

With a minimum of 12 months COBOL and/or Assembler experience are required.

Our Staff enjoy:-

- an attractive and congenial working environment
- free on-site facilities
- long term contracts (3 years)
- internal training at our own Staff College
- in-house and external training for specialised subjects
- a planned career structure
- 28 days holiday per annum including bank holidays

The Computer Centre, which is near Hayes, is easily accessible by road and rail and has its own spacious bus car park adjacent to the building. Interested? Then contact 'The Computer Centre' at 100, Haywards Road, Southall, Middlesex.



**British Transport Docks Board**

*A Nationwide Ports Service*

## Programmers

Salary to £5,300

## Senior Programmer

Salary to £6,500

**WATFORD**

The Engineering Industry Training Board has the responsibility for securing and maintaining standards in the Engineering Industry. The Computer Department consists of 36 programming and operations staff working on commercial systems on an ICL 1902T running under GEORGE 25 and MAXIMOP, with ICL 7500 range terminal equipment.

We currently require Programmers with a minimum of one year's COBOL experience to work upon maintenance of existing systems and development of new projects, including a system based upon IDMS Database.

The remuneration package consists of a salary up to the levels stated, depending on qualifications and experience, 55p per day Luncdon Vouchers and 23 days holiday per annum, increasing with service plus usual Public Holidays.

Please contact Peter Hart, Programming Manager, on Watford 44322, Ext. 41, for further details, or write for an application form to: Personnel Officer.

Engineering Industry Training Board  
41 Clarendon Road, Watford WD1 1HS



## SCOTT POLA RESEARCH INSTITUTE UNIVERSITY CAMBRIDGE FORTRAN PROGRAMMER

A vacancy exists for a Graduate Programmer with substantial experience in Fortran and if possible a knowledge of ALGOL 68 in the change of Soc for data analysis projects.

Outlets will include writing programmes in structured Fortran and Data Processing. Salary on the University Research Assistant/Associate Scale (£3497-£6932). Apply in writing to:

The Director  
Scott Pola Research  
Institute  
Lonsdale Road  
Cambridge  
(Tel: Cambridge 86489  
Ext. 400)

## COBOL - Herts

**IBM OS COBOL  
PROGRAMMERS**

For immediate start. Michael Jackson experience desirable, but not essential.

Phone AMS 01-635 8318

## We need your support

We have recently invested over £1 million on six GEC 4080's to form the basis of a new internal bureau with 50 on-line terminals providing system development facilities for programmers developing software for a variety of military and civil applications.

To run this bureau efficiently and effectively we need to expand our software support team by recruiting men and women with experience in the following areas of software support:

- system software, design, production, testing and implementation,
- system and disc file recovery,
- software security,
- system monitoring and tuning,
- fault diagnosis and investigation.

Languages used include CORAL, FORTRAN, ALGOL, and the GEC assembler, BABBAGE. The work involves close liaison with operations and programming teams with the emphasis on integrity and good communication. Experience of GEC software would be an advantage but is not essential.

We can offer you varied and demanding work in a friendly environment with excellent opportunities for promotion and personal advancement. The positions carry highly competitive salaries and benefits including assistance with relocation where appropriate.

If you think we could use your support, contact Chris Hill on 01-953 2030 ext. 3449 or write to him at Marconi Avionics Limited, Elstree Way, Borehamwood, Herts WD6 1RX. Alternatively, telephone: 01-207 3455 anytime (day or night) and we'll send you more information. Please quote reference MA 79143.

**MARCONI  
AVIONICS**  
A GEC-Marconi Electronics Company

## TEAM LEADERS Genuine Starting Salary £6,900 + Car + Benefits

South Birmingham and Coventry  
(Full Relocation)

"A sight for sore eyes" is probably how Columbus reacted on seeing land after years at sea.

If you share our high esteem for mini computers you'll probably feel the same way when you see our wide range of mini projects currently in hand.

We are a successful industrial manufacturing concern, heavily committed to an on-going systems development programme with mini computers performing a key role. We have a variety of mini computers already in use, the majority being in the DEC PDP range, which perform alongside our mainframes.

SOFTWARE IN USE INCLUDES DECNET, RSX 11M, MACRO, RTL 2, PL 1, IMS DB/DC

We are seeking to strengthen our management structure by recruiting Analysts with experience of minis or even micros, who possess the ability to successfully manage a team of Analysts and Programmers. Responsible for analysis, design and reporting aspects of the projects, we will expect a high degree of self control and the use of initiative.

We would stress that these are progressive positions with substantial benefits and career prospects.

A very comprehensive relocation package is available if required.

TO ARRANGE A CONFIDENTIAL INTERVIEW CONTACT OUR  
ADVISING CONSULTANT:

MARTIN STAINTHORPE ON: 021-236 3781 (24 hour answering service)  
OR: 021-744 1862 (evenings and weekends)

London 01-935 0671 3 Mandeville Place, Wymore Street, London W1M 5LB  
Birmingham 021-236 3781 35-37 Great Charles Street, Queensway, Birmingham B3 3JY  
Manchester 061-833 0427 Blackfriars House, The Parsonage, Manchester M3 2JA

**Specialist Computer Recruitment Ltd**

## LECTURERS

London & Home Counties to c£8500

We have been retained by an International Manufacturing Company who are currently seeking Computer Professionals who are either Analysts or Programmers who wish to move into a Lecturing environment. The ideal applicants will have been educated to degree standard have an outgoing personality and be able to work on their own. The company offer an excellent salary plus all the fringe benefits you would expect from an international company.

Reference HK 32/1

## BASIC + /RSTS PROGRAMMERS

London & Midlands to c£8000 + Bonus + Car

We currently have various vacancies for BASIC Programmers with a minimum of 1 years experience on DEC Hardware under R.S.T.S. The companies range from Software Houses, Users to Manufacturers. Applications encompass the whole range of commercial areas through to technical, and if so desired the successful applicants can move into Sales Support or R. + D.

All these positions offer an attractive salary and include the added advantages of company car or car allowance, and in all cases a form of Bonus Scheme is in operation.

Reference HK 32/2

## FORTRAN PROGRAMMERS

London to £7500

One of the leading Consultancy companies in the Civil Engineering field are currently seeking two Fortran Programmers with a minimum of two years experience for their Building Department. One ideally with some knowledge of highway applications and the other with a general construction background.

The ideal applicants will have a degree in Civil Engineering or an associated discipline but this is not essential as a good practical programming background will suffice.

The Company offer an excellent salary plus all the fringe benefits you would expect from a company of their size and standing.

01-439 7871 Reference HK 32/3

## ICL COBOL PROGRAMMERS

City to £7000 + 4 1/2% Mortgage

A major Insurance Company is about to take delivery of a new ICL 2960 machine, in order to continue the expansion of their data processing department. They would like to talk to professional programmers with upwards of twelve months ICL Cobol programming experience, although they have vacancies at various levels and would also be interested in people with considerably more experience. As well as the excellent salary the company have fringe benefits which are second to none including 4 1/2% MORTGAGE, FREE LUNCHES, FLEXTIME, ANNUAL BONUS, and a lot more!

Reference BP 32/4

## IBM COBOL PROGRAMMER

Middlesex to £9000

A large engineering company, a leader in its field, is currently involved in a large development program utilising an IBM 370/138. The person they are seeking will have a minimum of three years Cobol experience preferably with some OS/VS1 experience. This is a senior position for a capable programmer who is looking to expand their horizons. In return the right person can expect an excellent starting salary plus a superb fringe benefits package.

Reference BP 32/5

## NEAT 3 PROGRAMMERS

City c£7,000

One of the largest financial organisations is currently involved in a large expansion program on its NCR configuration which will make it one of the most progressive installations in the country. In order to complete this task they need to recruit several experienced Neat 3 Programmers, who will be retrained in COBOL for a conversion which will start next year.

The commencing salary together with superb fringe benefits including an annual bonus and cheap loans make these extremely attractive positions.

01-439 7871 Reference BP 32/6

**Datascene Recruitment Ltd**  
Sceptre House  
169-173 Regent Street  
London W1R 7FB

**datascene**

**01-439 7871**  
24 hour answer phone



# MYRIAD RPG II PROFESSIONALS

N.W. LONDON

c. £6500

A major manufacturing and retailing organisation with outlets throughout the U.K. and Europe is seeking additional programming staff to work on current and new projects.

This is an ideal opportunity to join a young department in which the successful candidate will be able to gain considerable experience of batch and on-line applications ranging from production and stock control to goods distribution and management statistics.

The installation uses an IBM System 3/15 D with 256 K and works to high standards encouraging the use of the latest techniques for which formal training is provided.

There are two vacancies 1) Programmer with minimum twelve months' CCP experience  
2) Programmer with minimum twelve months' RPG II experience.

Conditions of employment and opportunities of career advancement are excellent. A first-class commencing salary will be offered. Ref. N1/1608

**MYRIAD APPOINTMENTS LIMITED**  
30 Fleet Street London EC4Y 1AA  
01-353 0981 (24 HOURS)

**FRENCH-GERMAN-BRITISH  
RESEARCH INSTITUTE**  
has a vacancy for  
**HEAD OF CENTRAL  
COMPUTER SERVICE**  
to be responsible for the operation and support of computers for the Institute.  
A candidate for this post should have a minimum of 10 years experience in the operation of computers in the field of scientific research and the ability to lead and organise the staff.  
The salary will depend on the qualifications and experience of the successful applicant.  
Vacancies, allowances and pension for persons employed by the Institute are met, an indemnity and gratuity allowance for non-French staff.  
Application for this post should be addressed to: Mr. Rimmer, Institute, Laue - Langevin, 160X Camille D. Tr. 38042 Grenoble, Cedex, France.

## THE UNIVERSITY OF LANCASTER

Applicants are invited for the post of  
**TUTOR in the DEPARTMENT  
OF COMPUTER STUDIES**. The  
candidate will be responsible for the  
teaching of computer science to  
students with experience of micro-  
processors.  
Salary on the scale £4,131-£8,992

Further particulars may be obtained  
from the University of Lancaster,  
Establishment Office, University  
House, Lancaster LA1 4YW to whom  
applications (5 copies) naming three  
references should be sent not later than 3  
September 1979.

## STOP PRESS! PROGRAMMERS ANALYSTS

Wanted urgently for Client  
Call Pamela at  
**VIR CONSULTANTS**  
01-404 0165  
(Emp. Agency)

**IBM/OS COBOL  
IMS WOULD HELP?**  
**USA**  
\$20K - \$30K  
Ring Ian Cox  
01-278 6826 (day)  
01-272 2704 (even)

## BRIGHTON POLYTECHNIC COMPUTER CENTRE

The Computer Centre provides a comprehensive educational programme in computer science. It is currently based on ICL 1900A, Hewlett Packard 3000 Access and Harris S125 computers. A number of state-of-the-art systems will be acquired shortly and planning is afoot to begin for major developments in the 1980s.  
Applications are invited for the following key post:

## MANAGER: USER SERVICES

£6087-£8253 plus £0.00 per month supplement pending outcome of comparability study.

To hold an expanding section with responsibility for providing the primary interface between the Computer Centre and its users. For further details and an application form, please contact the Personnel Officer, Brighton Polytechnic, Moultoncombe, Brighton BN2 4AT. Tel Brighton 603665 ext. 2537.

The closing date for receipt of applications will be 24th August 1979.

## university college of SWANSEA

## Full-Time/Part-Time Programmer

Applications are invited for the vacancy of Full-Time/Part-Time Programmer in the Department of Civil Engineering to provide programming support on the S.H.C. Interactive Computing Facility. The system is based around a PDP 11/40 running under the RSX11M operating system. Duties will be mainly concerned with providing a program advisory service for research workers, together with some application programming. Applicants should preferably have a degree or equivalent qualifications in computer science, engineering or mathematics, with good knowledge of FORTRAN. Part-time applicants will be considered. Further particulars and application forms (2 copies) may be obtained from the Personnel Officer, University College of Swansea, Singleton Park, Swansea SA2 8PT, to whom applications should be sent by Friday, August 31, 1979.

# Scicon

**Consultancy at Scicon  
£5,500 to £9,000 Neg.**

Scicon is a leading international computer systems and consultancy company. The Management Sciences Division has a variety of openings for people who hold a qualification in a computer subject and who have demonstrated a successful career over the last two or more years in some of the following areas:

- \* MATHEMATICAL PROGRAMMING
- \* MODELLING TECHNIQUES
- \* SYSTEMS ANALYSIS/DESIGN
- \* SCIENTIFIC PROGRAMMING
- \* PROBLEM SOLVING
- \* STATISTICAL TECHNIQUES

The division offers the opportunity to work on a variety of projects in environments such as industry, civil government, Research Institutes and International Organisations. In particular a major application in the industrial field is within the Oil and Gas Industry. This involves the design of optimisation systems, resource development, resource scheduling and investment planning. Experience in any of these areas would be advantageous.

Candidates should have the ability to communicate at all levels and should be ambitious, enthusiastic and able to work under pressure within rigid timescales. This will result in rapid career progression and a commensurate salary.

Contact Jack Cowdy, Director, 01-603 7335

**Information Processing People**  
58 Pembroke Road, London W8 7AB. Tel: 01-262 9341  
Computer Services & Recruitment Consultants. **01-603 7335**

**AKPE**  
ALLGEMEINES KRANKENHAUS WIEN  
PLANUNGS- UND ERRICHTUNGS-AG  
1090 WIEN, LAZARETTGASSE 20  
TELEFON 0222/43 89 51 DW

## Call for tenders

for computer software products for the New Vienna General Hospital (University-Clinic).

**Ausschreibende Stelle:**  
Allgemeines Krankenhaus Wien,  
Planungs- und Errichtungs-  
Abteilung (AKPE)  
Lazarettgasse 20, 1090 Wien, Tel: 41 89 51. Telefax: 134 53

für die  
Allgemeine Gemeinschaft der Republik Österreich  
und der Stadt Wien für den Neubau des  
Wiener Allgemeinen Krankenhauses (Universitätsklinik)

**Scope of tender:**  
The tender has to include an already existing software product for the fields of patients, operations, pharmacy and goods administration, which is to be used on the one hand with the existing computer IBM/370-158 as the central processing unit and which is adaptable to the special requirements in the New Vienna General Hospital (AKPE) on the other hand. Any necessary special peripheral hardware (e.g. TV screens, printers) as well as processing software should be included in the offer.  
Die Angebote sind in deutscher Sprache abzugeben.

**Angebotstermin:**  
Die Angebote sind bis Dienstag, 25. September 1979, 8.45 Uhr, in verschlossenen Umschlägen mit der Aufschrift „Angebot über Softwareprodukte Informationssystem AKPE, der Firma“ abzugeben.

**Öffentliche Angebotsöffnung:**  
Dienstag, 25. September 1979, 9.00 Uhr, Sitzungszimmer, AKPE, Wien.

**Zuschlagsfrist:**  
12 Wochen.  
Die Ausschreibungsunterlagen sind ab Montag, 13. August 1979 gegen Einzahlung von 65.500,- bei der AKPE, 1090 Wien, Lazarettgasse 20, Erdgeschoss, Zimmer E.105, werktags (außer Samstag) von 9.00 bis 12.00 Uhr erhältlich. In dieser Zeit kann bei der Arbeitsgemeinschaft Betriebs-Umstellung, 1160 Wien, Neulandfelder Straße 12, Dr. Böhm, Telefon: 43 59 94 nach telefonischer Anmeldung in Unterlagen und Pläne Einsicht genommen werden.

Angebote von Firmen können nur dann berücksichtigt werden, wenn die Bewerber alle in Österreich notwendigen Beeidigungen und nachweisbar den nötigen Betriebsumfang und die entsprechende Erfahrung besitzen.  
\* Die Ausschreibungsunterlagen werden jedoch Interessenten aus dem Ausland auch gegen vorherige Einzahlung von 65.500,- auf das Konto bei der Zentralsparkasse der Gemeinde Wien 696-025-303 unverzüglich nach Einlangen des vorerwähnten Betrages zugesandt.

## CLASSIFIED COPY

All classified copy should reach our offices no later than 5.30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday.  
Ring David Abbey for further details on 01-261 8016

# ICL OPERATORS and DATA CONTROL CLERKS

**change to a London brewery with ICL 2960's  
and enjoy up to £5,000 with all the benefits!**

Located in West London, one of the major UK breweries utilising twin ICL 2960's, have vacancies for both operators and data control clerks.

Two operators, with upwards of one year's operating experience on ICL mainframes are required to complete the existing operations team. A five day week, three shift system is worked.

Vacancies also occur for two data control clerks with experience of controlling computer input/output and capable of maintaining mag tape records. In the control area a sociable shift pattern of 7.30am to 3.30pm and 11.30am to 7.30pm is worked on alternate weeks.

As one would expect from a leading brewery, the benefits package is first class and includes a start salary of up to £5,000 incl. plus generous paid overtime, excellent restaurant and ample car parking. Career prospects are good, for example, these current vacancies have been caused by promotions to the programming area.

For further information (including data sheet describing our client's computer development) contact REX SCOOONES at our Croydon office.

Positions open to male & female applicants, please telephone (24 hour service) for initial discussion or write to address below. QUOTE REF: CW 168-95

COMPUTER AND  
PROFESSIONAL  
PERSONNEL  
CONSULTANTS



**CAPP ASSOCIATES**  
LONDON AND MANCHESTER



Computing  
ASSOCIATION

**01-686 9693**  
11, HOUSE DINGWALL, 3  
CROYDON CR9 2AU

# ICL Operators

It now has:

- \* 12 months on ICL 1900s
- \* Plus George II experience

Then we would like to see you.

Our existing ICL 1900 installation based at Enfield on the North London/Leeds and other branches is transferring its operation over the next 2 years to a central ICL 2972/AMIB system. We need experienced ICL 1900 operators of various levels and offer you:

- \* An initial salary inclusive of shift allowance in the range £3,800-£5,800 p.a. depending on experience.
- \* Excellent opportunities for progression.
- \* Full training where necessary.

To find out more and arrange an early interviewing one of our Computer Operations Managers

Phil Brathwaite or Les Mansfield, on 01-366 1234 ext. 288 or 388 or write to:

The Personnel Office,  
Eastern Gas, Tower Point,  
Sydney Road,  
Enfield, Middlesex.

**EASTERN GAS**

## INTEL 8080 Experience? — Work on the Coast this Summer

We have several immediate and future vacancies in Sussex for people with sound Intel 8080 experience.

If you have a permanent job or are available now we will be happy to discuss the opportunities awaiting you.

Call Neil, Suzie or Richard  
on 01-491 4708

**Knight** Staff Services Division (P.O.) Data Services and a specialist in Computer Services Recruitment

## GEO 111 COBOL

SEP. START  
3 MONTHS+  
ESSEX

0902-751435

# PROGRAMMING PROFESSIONALS IRELAND c. £8,000

The demand for programming expertise is soaring with the result that we have been retained by several influential companies to recruit experienced programmers and programmer/analysts.

These vacancies offer worthwhile career opportunities to individuals, to develop their technical and business expertise. Several offer definite progression into D.P. management in multi-national companies, with salaries typically in the £7-8,000 bracket (some even higher).

Do you feel like a change close to home?

Would you enjoy working in a fast-growing economy where the quality of life is still high?

Then please phone, in strict confidence, Glenn Donnelly (Advising Consultant) to discuss these vacancies.

**ZEUS-HERMES RECRUITMENT**

Computer Staff  
Recruitment Ltd. **01-491 4708**

**To a Programmer  
with potential...**  
...we can offer the opportunity to play a significant part in a company within one of the world's largest organisations.

Our Head Office location on the South Coast employs 150 people and someone with one or two years programming experience can soon play a key role in the system's development within the company. We're looking for a young graduate, preferably with COBOL experience, to work initially on a real time data base system on Data General C330 and M800 computers. The company is about to extend the use of on-line methods into other aspects of its commercial systems, which currently operate by RJE to a major IBM computer centre in London. Future development plans include a substantial data base system for our manufacturing plant on IBM equipment and future career progression could be in this direction.

If you have the potential and the ambition necessary to join this project, we will offer a highly competitive salary and benefits package which will, of course, include relocation to the South Coast.

Please write with full personal and career details to: Mike King, Employee Relations Department, Esso Chemical Limited, Arundel Towers, Portland Terrace, Southampton, SO9 2GW



## Contract Requirements

**PL/1**

IMMEDIATE REQUIREMENTS: DOS & OS  
LONDON - KENT - PETERBOROUGH - HANTS  
Call Richard or Suzy on 01-491 4708



**OVERSEAS CITY  
MERCHANT BANK**

IBM 34  
SYSTEMS  
OPERATOR

For full details of this position  
write to: Mr. C. J. King  
Esso Chemical Limited  
Arundel Towers, Portland Terrace,  
Southampton, SO9 2GW



# GO WITH GAMMA IN THE '80's

## SALESMEN AND SALESWOMEN

Earn commission selling **Gamma** systems with Gamma. The company is looking for top calibre sales staff. Earnings will be above average.

## ACCOUNT MANAGERS

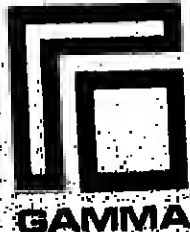
Gamma is now appointing managers to handle its large corporate accounts and vertical market customers.

## PRODUCT MANAGERS

The company is also seeking managers to handle its horizontal market customers and products. The appointed managers will be responsible for the efficient large-scale distribution and implementation of computer systems.

It is Gamma company policy to give preference in recruitment and promotion to individuals with proven management skills.

Call or write to-day  
The Personnel Office,  
Gamma Associates Ltd,  
Newland House,  
Mount Street,  
Nottingham.  
Tel: 0602-412555



Gamma Associates, the largest international systems house OEM specialising in **Gamma** systems, has created a number of vacancies with 5 figure potential salaries in its rapidly expanding organisation. Positions are based in Nottingham, London, Wokingham and Manchester.

GAMMA

## SYSTEMS ANALYST up to £6,936

Our purpose built Computer Centre operates a 384K word 1908A with EDS80, Magnetic Tape and GEORGE 3 Operating System, 2 Communication Processors and approximately 100 Terminals.

The duties of this important post include analysis, design, documentation and implementation of wide ranging projects including financial and non-financial applications, plus Communications and Data Base orientated systems.

Applicants should have a minimum of two years systems experience, a proven record of success in implementing at least one major project and ideally, a formal qualification.

We offer flexible working hours (36% per week), generous holiday entitlement, car parking facilities and assistance with removal expenses in certain cases.

Candidates, male/female, may obtain application forms from:

Principal Chief Officer and City Treasurer,  
City of Birmingham Treasurer's Department,  
Council House, Birmingham B3 3AB.  
Telephone: 021-235 2385.

Canvassing will disqualify.

**BIRMINGHAM  
CITY COUNCIL**

## TELCON METALS LIMITED Manor Royal, Crawley

The Company is part of the BICC Group of Companies and manufactures high precision alloys for a wide range of industries including electrical, electronic and automotive and have a vacancy for:

## DATA PROCESSING MANAGER

to take responsibility for a small Data Processing and Systems Department using an ICL 7502 and 7603 connected to a 2980 running under OME in the north-west of England.

Responsibilities will include all development, running and maintenance of a wide range of applications together with supervision of the O & M Function.

The position will suit a person who has management experience coupled with a background in analysis and programming. Every opportunity will be given the selected applicant to extend their knowledge of management and project leadership.

Assistance towards relocation expenses will be given where appropriate. Salary £8600-£7000.

Write with full CV to:

Mr. J. W. Ward, Personnel Manager  
Telcon Metals Limited  
Manor Royal, Crawley, West Sussex  
Crawley 28800

## DATA PROCESS SUPERVISOR

A Public Company requires for its North West London subsidiary a Data Processing Supervisor/Analyst to operate its computer systems. After a period of familiarisation it is envisaged that further work in developing programmes for the Group as a whole will be undertaken.

The successful candidate (male/female) will probably be a graduate with a computer sciences degree or statistical training to degree or HNC level seeking to gain experience in operational analysis.

Salary will be fully commensurate with the responsibilities of the post together with fringe benefits which include a contributory pension scheme.

Applications with details of background and experience to:

Group Personnel Consultant  
BLAGDEN & NOAKES (HOLDINGS) LTD.  
15/18 Hatton Garden, London, EC1 8FJ

## Computer Operators with large systems experience

**Southampton**  
**£4462-£4971 inclusive of shift allowance**  
**(under review)**

Associated Container Transportation Services Ltd. operates world-wide through container services on behalf of five major shipping lines. Recently we have installed a B8700 computer with an on-line Database system to supplement and eventually replace our existing Honeywell 2080.

We now require Operators and a Senior Operator to work with both of these installations.

If the challenge of such a position appeals to you, and you have obtained a couple of years' large systems experience, preferably with Burroughs equipment, we should like to hear from you.

The post is based in our modern air-conditioned offices in Southampton and relocation expenses will be paid where appropriate.

The salary offered will be in the above range, dependent on experience; however, all our salaries are currently under review and will be revised with effect from 1st October. In addition we also offer an attractive range of fringe benefits.

If these posts interest you, please write or telephone for an application form and further details to:

Mrs. L. Llaney, Assistant Personnel Officer  
ACT Services Ltd.  
Ridgeway House, Terminus Terrace, Southampton  
Tel: (0703) 34433

## Technical Authors Croydon

£6 - £8 K

An opportunity for those with experience of Real Time Mini Computers/Telecommunications or Intel 8085 Communication Products: You may be Hardware or Software orientated as our Client is prepared to offer some training. Occasional travel to Europe and excellent relocation expenses.  
Ring Real Time Mini's 24-hour personal answer hotline now - 836 9719 or 9882 day, night or weekend, and ask for Beryl McLaren.

**Jupiter** Computer Appointments  
(Real Time Mini's Place) Reg. Cons.  
Suite 41/42  
12/13 Henrietta Street  
London, WC2

## BASIC / COBOL PROGRAMMERS

Brand new project

S.W. London / N.W. Surrey

To £6,000+ p.a.

Telephone:

Glenda Jones, 01-505-5576

*Carries Rothmans*

## Programming Project Leaders Cobol Programmers

Vacancies for the above positions exist in the Technical Support Department at Basildon, Essex, which plays an increasingly important role within this international tobacco company, as it operates successfully in a highly competitive market.

We have two mainframe configurations, each comprising of an ICL 1903T supported by EDS 60s, magnetic tapes, card readers and line printers.

The work would involve the development and implementation of a wide range of business systems, writing programs in COBOL to run under the GEORGE 11 operating system.

The Department has recently purchased a number of microcomputers which will be used to develop systems written in COBOL and has also produced a system, written in BASIC, for use in the U.K. and overseas regions.

Successful applicants would be placed according to their experience and those wishing to be considered for the position of Programming Project Leader should have a minimum of 4 years' commercial programming experience, including some involvement in team leading or systems designs.

Hours of work are normally 8.45 a.m. to 5 p.m. Monday to Thursday and 8.45 a.m. to 1 p.m. on Friday although the Programming Project Leaders, being members of our management team, have no fixed hours of work.

Other benefits include:

- \* Generous Holiday Allowance
- \* Excellent Company Pension Scheme
- \* Subsidised Canteen
- \* Full Sports and Social Facilities

Please write for an application form to:

Lyn Lock (Mrs.)  
Personnel Officer - Administration  
Carries Rothmans Limited  
Christopher Martin Road, Basildon, Essex



## SENIOR PROGRAMMER

### THE COMPANY

A statutory organisation providing insurance against the high cost of serious illness. VHI has a Honeywell 62/60 Computer with disk and tape systems using 192K Memory and associated V.I.D.U.'s.

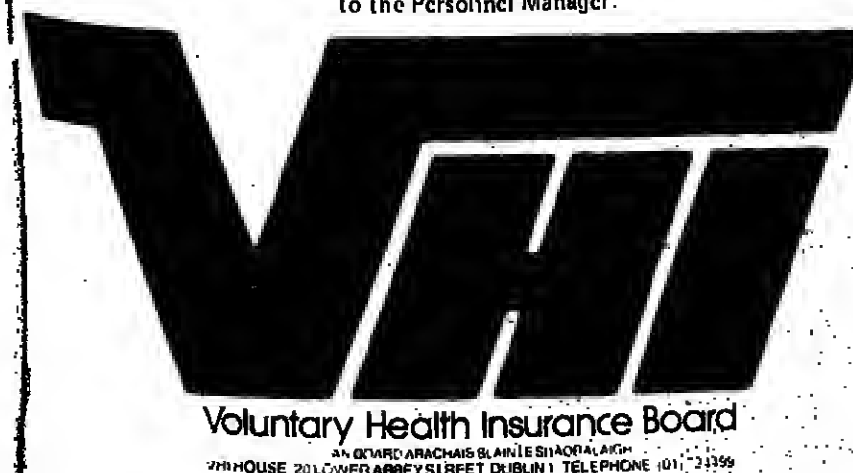
### THE CANDIDATE:

Applications are invited from persons with 3 to 5 years' Cobol programming experience, preferably on a Honeywell computer. Knowledge of Communications programming an advantage. The successful candidate will be capable of working as part of a team.

### BENEFITS:

Attractive salary commensurate with qualifications and experience backed up by an attractive range of fringe benefits and excellent working conditions.

Applications giving full details should be made to the Personnel Manager:



Voluntary Health Insurance Board

AN QUAD ARACHUS BLANLE SHADAL AMH  
27A HOUSE 20 LOWER ABBEYS STREET DUBLIN 1. TELEPHONE (01) 23399

## CLASSIFIED COPY

All classified copy should reach our offices no later than 5.30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday.

Ring David Abbey for further details on 01-261 8016.

## ★★ DISCOVER AMERICA★★

From New York to California

LAMBDA TECHNOLOGY INCORPORATED, a leading computer services company is seeking qualified individuals with an enterprising spirit for unique temporary employment opportunities (one to two years) at our New York, San Francisco and Los Angeles offices.

We require individuals with at least 2 years' experience in any of the following:

- \* COBOL, PL/1, ASSEMBLER
- \* IMS - O/R OR D/C
- \* CICS
- \* AIRLINE RESERVATION SYSTEMS

Salaries are fully attuned to experience, background and ability. Full return airfare, relocation expenses and temporary accommodation provided.

Lambda Technology will treat you as an individual and offer you the opportunity to exercise and expand your abilities within a secure and well-respected organisation. As a part of a team of professional and responsible people who enjoy their work.

Why not explore the possibilities? Send your résumé in confidence or telephone:

Mr. Tony Blomfield, Director  
Lambda Technology, Incorporated  
Suite 500, Chesham House  
150 Regent Street, London W1R 5FA  
Telephone: 01-439 6288

## THE SALES AND MARKETING BIT

### MONEY MATTERS-2

## Discounts and bad debts

FOR many people a reasonable price is that which remains when one has subtracted a discount.

There are two significant factors related to discount. Firstly, one quickly reaches a point where the job requirement is for an order-taker rather than a salesman. Secondly, if a company cannot consistently maintain its profit levels, it is likely to go out of business.

Too many salesmen are convinced that price is the paramount factor within the decision-making process, when in fact many considerations are at least as important - company liability, delivery, related experience, reference clients, support services, product reliability, capability, quality, performance, etc.

Yet, essential as these factors are, their quality must decline relative to the reduction in the profits which fund them. If discounts are relevant and necessary, they should be the last item on the agenda of sales negotiation, not the first. Starting out by offering a discount is probably the best means of destroying one's professional credibility.

It is unfortunate that the salesman has, for the most part, little control over the profitability of his company other than maintaining standard prices. Otherwise, it would make a lot of sense for sales targets to be based on profit rather than revenue.

However, a multiplying factor related to the deduction of discount from sales commission might be a reasonable incentive. That, of course, assumes the discount was the salesman's idea and not his manager's.

Discounts are effectively academic when it comes to the critical factor of payment. A sale is not a sale until the goods are paid for.

I am always surprised when I hear people pose the question "Who is responsible for getting the money in?" It seems to me to be a contrived dilemma, a book-keeping exercise, so that no one gets lumbered with the nasty job of asking people for money.

Make no mistake; it is the salesman's responsibility to ensure that payment is ultimately made. It is his job because agreeing a price and a time of payment must be part of his formal presentation and subsequent contract.

Only in circumstances where his company fails to deliver the goods (rather than he) promised to deliver can he have the possible excuse of getting out from under. Even then, he is still the one who has the face-to-face contact and therefore is most likely to obtain payment for services or products rendered.

The question of debt collection also raises the point of related commission. Should commission be paid before the client pays the bill?

To a degree it very much depends on the delivery lead-time. It would be unfair for the salesman selling large value capital products on extended delivery lead-times to have no credit for securing the order.

On the other hand, maybe this type of sales should be on such a high proportion of basic salary to commission that payment of commission on settlement of bill might not be too much of an imposition.

From an accounting and administrative point of view, payment of commission at any time other than when billing occurs is usually more nuisance than it's worth, although bad debts are usually deducted when they are confirmed. Consequently, few companies actually hold the commission of payment until the money comes in from the client.

Nevertheless, it is both unreasonable and inefficient to leave bad debt collection to continual letter writing and occasional telephone pleas of the accounts department. A quick face-to-face from the salesman who sold the goods is usually the best way of getting the money.

One way in which the salesman can both make the point on subsequent prompt payment and sometimes help the client at the same time, is to offer hire-purchase or leasing terms when actually making the sale. You would be surprised at how many people withhold payment, not because of that small technical fault or that slight departure from specification, but simply because they can't afford to pay.

Could that mean they were over-sold in the first place?

TRADER

### PRODUCT NOTES

## Modern simulator

FOR panel mounting applications, the data communications division of Lion Systems Development has introduced the modern simulator, Model 1880.

The Model 1880 will operate at speeds of up to 19,200 baud in an asynchronous full duplex mode on twisted pair cable. Data can be transmitted for distances of up to 4 kilometres at DC levels with complete isolation between data terminal equipment.

Product features include low operating power and local loop back.

Lion Systems Development (CV), Halifax House, Halifax Road, High Wycombe, Bucks. Tel: High Wycombe 35023.

### Puzzle Answer

The five-move solution is: 10-3, 11-6, 8-10, 4-1, 6-4, 7-2.



# Programmers Walk into an extra £1½K

Look at these outstanding opportunities for Programming Staff! Our D.P. Operation is based on a large ICL mainframe, involves a large number of mini-computers, and includes a communications network.

## SENIOR PROGRAMMERS

Work entails participation in system design, program specification writing, quality control, and the supervision and scheduling of teams of programmers. Applicants should have around 5 years' meaningful experience using COBOL.

### Location

Feltham, Middlesex. Ideally situated between the M3 and the M4, and close to Feltham Railway Station.

### Salary

Candidates with the correct qualifications could expect to significantly improve their current salary. We would not be surprised if this amounted to an extra £1½K.

## PROGRAMMERS

Must be capable of producing correct programs within an agreed timescale. COBOL experience is essential. Some of the programming work involves mini-computers; training will be provided.

### Other Benefits

Free 3-Course Lunch, Subsidised BUPA, Pension Scheme, Free Life Insurance, Free Christmas Turkey, Sports and Social Activities, Relocation Expenses where appropriate.

Please telephone Angeline George for an appointment on 01-890 1313.

THE **RMC** GROUP

We're into much more than you think

# International EDP Auditor

## We are seeking:-

an EDP Professional with basic accounting knowledge to join our EDP Auditing Group on assignments that cover all EDP aspects of Mobil's worldwide petroleum and chemical operations.

## The work involves:-

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## BOOK REVIEWS

# The joys of writing programs in PL/M

# 'Don't put all your comms eggs in one packet'

A guide to PL/M programming for microcomputer applications, by Daniel McCracken. Addison Wesley Publishing Co Inc, 11 Hills Place, London, W1R 2LR. 262pp. £7.50.

This book is the other end of the spectrum of interest from Digital Circuits (CW, March 1). It describes a language which enables the user to regard not just the electronic circuits of a microprocessor as a "black box", but its entire architecture, including its instruction set.

It is interesting to speculate that the future systems designer may well work at each end of this spectrum, and not much in the middle: microprocessor, some RAM, peripheral interfaces, digital converters, then some language for his creation without ever knowing what the Store Accumulator A is in hexadecimal.

The book is more for learning than for reference. It has plenty of explanation, examples and exercises, rather than formal definitions which can probably be obtained from a manual. It does, how-

ever, have a good index, produced by a program described in the text.

There are two possible classes of reader—those who are intending to use a PL/M-type language, and there is one for most popular microprocessors, e.g. PL/Z for the Zilog Z80 on a micro, and those who are simply computer students, who are being given PL/M as a "modern programming language", and may well be using a microprocessor-based teaching computer simply because it is cheap.

For the first kind of student this book is an excellent introduction, but one must point out that the choice of PL/M is by no means a foregone conclusion, and the alternatives, such as machine code, Assembler, Basic, Coral, Cobol, Fortran, or RTL/2 have to be considered, since one's choice of language is probably dominant in determining the total cost of ownership of the software concerned.

It would have been useful to have included some rough guide to how efficient the compiler is. In generating fast, short code and how the elapsed time to write and debug a program in PL/M compares with its competitors.

The reviewer has a soft spot for PL/M, a language much reviled by purists, since he developed some flight planning systems on it in the mid 60's.

It scores when the application demands, as his did, a mixture of mathematics and low level data manipulation. If mathematics alone are needed, we can use Fortran or Algol or, provided speed of execution is not required, Basic.

If low level data manipulation is needed, as in McCracken's index-producing program, Assembler is adequate and may be as quick to write, by a trained programmer.

But if the system needs both, PL/M scores.

Furthermore, even if individual problems do have both aspects, it may be a PL/M language in a particular project team in order to reduce training costs and increase interchangeability of staff.

For the second possible kind of student—the one who is using PL/M and a microcomputer simply because PL/M is a "typical language" and a micro is a cheap system on which to learn—one should issue a slightly different warning: PL/M languages are fairly

readable and do not contain the "blips" that madden the newcomer to Algol and Coral, or the ODs and FIs which make such languages more fool-proof. Programs written in PL/M type languages get through compilation more easily than others with more rigorous and less forgiving syntax. This means that incorrect programs have a better chance of reaching the stage of producing incorrect results, and this is a very big problem for the beginner.

Secondly, the practical problems of compiling, rather than assembling or interpreting, will make the turnaround rather longer: this may be a considerable factor in choosing a language as an ad hoc training vehicle. Perhaps a PL/M interpreter may be the answer?

But in spite of these warnings, one has to say that it is extremely well done, and it is nice to see McCracken, who wrote his first book on digital computer programming back in 1957, is still an old pro like Knuth and Dr James Martin.

Let's hope to read in 1980 McCracken on "Programming Associative Manifolds in Telepathic Metastructures" or something of the sort.

Communications satellite systems, by James Martin. Prentice Hall International, 66 Wood Lane End, Hemel Hempstead, HP2 4RG. 397 pp. £25.55.

CAN Man prevent the onword march of technology? Does he want to? Does he need to? Where will it end? Will it end? Martin's latest book on satellite communications presents much thought-stimulating material.

Some 40 years ago Bernal and Clarke predicted the linking together of the human species and computers into one "macroscopic organismal complex".

This book indicates how this might be achieved through the medium of communications satellites and various interactive Man-computer devices. Consequently to this, in the long term, the author sees the basic nature of Society changing quite drastically—mainly as a result of the fundamental interaction that this new communications technology will permit.

techniques such as the Vernam system, Lucifer and the US Federal Standard based upon LSI chips.

Naturally, the problem with communication satellites is that they could easily be destroyed by an unfriendly rocket. This prompts the author to hint at the possibility of the Russian destruction of US satellites.

Surely, land communications devices are equally susceptible? He concludes this chapter with the rather apocalyptic description: "Survivability in an immensely complex technological society depends upon diversity". In other words: "Don't put all your communications eggs in one packet!"

The book is produced in a very high standard but is not entirely free of typographical errors. Page 19, for example, contains a "nonsense" sentence that obviously escaped the attention of those who proof-read the text.

Unfortunately, some of the chapters of the book duplicate material that is presented in several of the previous Martin telecommunications books.

Still, one would go as far as predicting that this book will be yet another "best seller" for James Martin.

Here the author discusses the need for encryption.

Dr PHILIP BARKER

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